REPORT

OF

TOPOGRAPHIC AND GEOLOGIC SURVEY COMMISSION

OF

PENNSYLVANIA

1913-1914

DATE DUE			

BIENNIAL REPORT

OF THE

TOPOGRAPHIC AND GEOLOGIC SURVEY

OF

PENNSYLVANIA

For the Two Years Ending June 1, 1914.

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1914

TOPOGRAPHIC AND GEOLOGIC SURVEY COMMISSION

GEORGE W. McNEES, Chairman, Kittanning.

ANDREW S. McCREATH, Harrisburg.

EDWARD V. D'INVILLIERS, Philadelphia.

RICHARD R. HICE, State Geologist, Beaver.

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LETTER OF TRANSMITTAL

To His Excellency John K. Tener, Governor
and the Legislature of Pennsylvania:

Sirs: The undersigned, Commissioners of the Topographic and Geologic Survey of Pennsylvania, have the honor to submit the following report of the work during the two fiscal years ending May 31, 1914.

A general summary of the work accomplished and in progress will be found in the report of the State Geologist, herewith submitted.

Pennsylvania occupies a position of its own as a mineral producing State. The enormous mineral production is shown by the fact that the county of its capital reaches 24 per cent. of the total mineral production of the United States. The average mineral production per square mile is almost 20 times the average for the United States and nearly twice the value per unit of area of any other State in the country, while its total value is almost four times that of Texas, which State, the second and third States in rank in respect to total mineral output.

The Commissioners cannot too strongly urge the importance of the prosecution of the work on a scale commensurate with the need for topographic surveys within the State and the demands of the mineral industry, and the necessity of its continuance under such conditions as will conserve our resources while encouraging production.

For these reasons your Commissioners recommend and urge the appropriation of not less than $50,000 for each of the next two years, a sum which will enable a more vigorous prosecution of the work and the study of some of the larger problems which so urgently require attention. While such a sum will be relatively but one-tenth of the amount appropriated for similar work in any of our neighboring States, yet it will go far towards meeting many of the pressing demands for the work under this Commission.

Respectfully submitted,

GEO. W. McNEES
A. S. McCREATH,
E. V. d'INVILLIERS,
Commissioners.

Harrisburg, Pa., June 1, 1914.

To the Topographic and Geologic Survey
Commission of Pennsylvania

Sirs: I herewith submit a short report on the work of the Topographic and Geologic Survey of Pennsylvania for the two years ending June 1, 1914, together with a brief account of the work [illegible]

Respectfully submitted,

RICHARD R. HICE,
State Geologist.

Harrisburg, Pa., June 1, 1914.

INTRODUCTORY

The work under the direction of this Survey divides itself into two general classes.

Topographic Work. This includes the preparation of maps of such accuracy and detail as will show the natural features of the surface, the character and relief of the same, its drainage and water features, and the culture as it exists at the time of the preparation of the map.

Geologic Work. This embraces the study of the geologic features of the State, with special reference to the economic products of value and minerals of importance occurring within the State. The first is absolutely necessary as a foundation for the second, and the well recognized fact that no accurate geological work can be accomplished without good topographic maps.

The work was originally started under an Act of Assembly, approved April 3rd, 1905, which authorized the Commission appointed thereby on behalf of the State to enter into a contract with the United States Geological Survey for the preparation of a topographic map and for other geologic work.

Since that time there have been slight changes in the work as originally planned, and your Commission, under the present law, is authorized to co-operate with other Bureaus of the National Government, such as the Bureau of Mines and the Bureau of Standards, as well as the Geological Survey. These national organizations are now in charge of certain classes of work which are so closely affiliated with your geologic work that they must necessarily be included in many phases of geologic work. The need for geologic investigation of a somewhat different character than that carried on by the United States Geological Survey has led to the authorization of geologic work by the State itself.

The results of the work accomplished are embraced in a number of reports issued by the United States Geological Survey, and others prepared under the immediate direction of this Survey. A full list of these reports will be found in the appendices to this report.

TOPOGRAPHIC MAPPING.

There have been but few changes made in the methods of topographic mapping used by the United States Geological Survey from those briefly described in a former report.*

In the original agreement with the United States Geological Survey it was arranged that the State should be mapped in rectangular areas, called quadrangles, each of which would include 15′ of longitude and 15′ of latitude. This was done to bring the map of Pennsylvania into harmony with the general map of the United States. The boundary lines of Pennsylvania do not coincide with the accepted lines of longitude and latitude, and hence in the preparation of the map there are a number of quadrangles which will lie partly within Pennsylvania and partly in one or more adjoining States.

The estimated area of Pennsylvania is 45,126 square miles, and the total number of quadrangles lying wholly or partly within the State will be about 240; the complete map will, therefore, embrace that number of individual sheets. The scale of the map, as provided in the contract, was to be 1-62,500 of nature or approximately 1 mile to the inch.

All streams within the power of this scale to express were to be accurately located, and all roads correctly platted. To the average eye distinctions in location on a map can be made within 1-100th of an inch; therefore all cultural and other features are located with such accuracy as to fall within this limit, which means that the actual locations must be within a limit of error of approximately 50 feet.

The relief of Pennsylvania varies widely; hence it was arranged in this contract that differences in elevation should be shown by contours, or lines of equal elevation above the accepted ocean level, with an interval of 20 feet. There are places in the State where it is impossible to indicate such minute differences in level on a map of a scale of 1 mile to the inch, but over much the greater portion of the State the interval adopted will be well within the scale of the map, and at the same time show the relief with great accuracy and detail.

A small portion of the State comprised in the Anthracite Coal Region had been mapped by the United States Geological Survey prior to the time of the organization of the co-operative work. Including the area then mapped a total of 144 quadrangles, lying wholly or partly within the State, have been completed. The total

*Report Topographic and Geologic Survey Commission, 1899-1906, pp. 29-36.

area within the State thus mapped is approximately 24,375 square miles.

During the time covered by this report detailed mapping has been prosecuted and completed in the Mercer, Stoneboro, North East, Somerset and Milford quadrangles, and is in progress in the Wind Gap, Hanover and Windber quadrangles.

The completion of the North East quadrangle, lying east of Erie, closes the only remaining gap along the southern shores of the Great Lakes, and enables the completion of their study, and also of those prehistoric shores of larger water areas which are found above the present lake levels. Thus the determination is possible of the changes in level of the land which have taken place in this region since the time of the glacial period, when these old beaches were formed by the waters of receding lakes lying between the retreating ice and the lands toward the south.

The Mercer and Stoneboro sheets complete an important area in Mercer, Butler and Lawrence counties on which work has been under way for several years: the Somerset area embraces an important portion of the Somerset coal fields, which are being so rapidly developed at this time. The Milford area was taken up and completed in view of the fact that the States of New York and New Jersey desired to map their portion of this area at the present time.

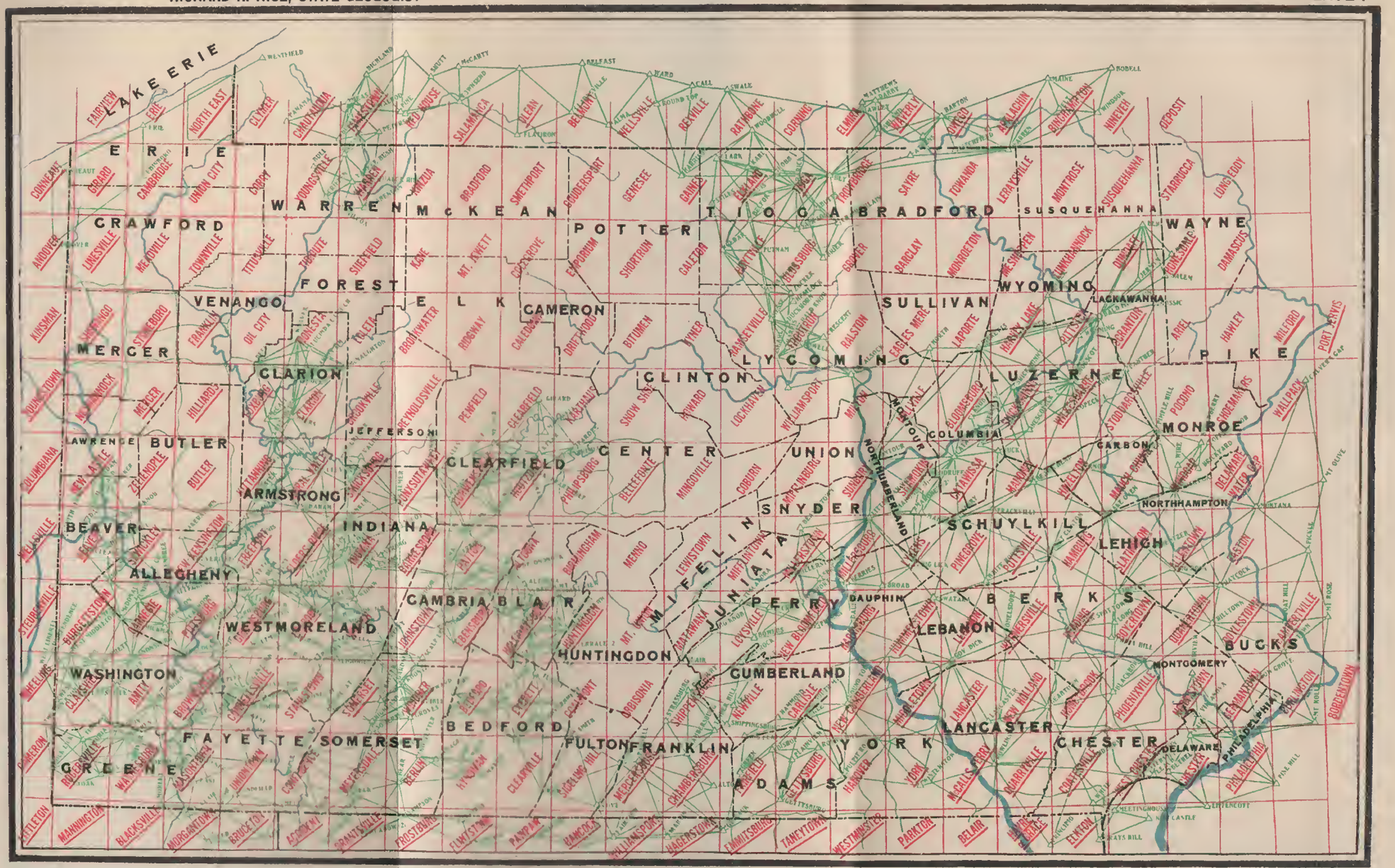
The detailed mapping under way the present season (the Windber, Hanover and Wind Gap quadrangles) covers important economic areas. The Windber quadrangle will complete a very large portion of the Somerset coal fields, lying east of the Somerset and south of the Johnstown quadrangles. The Wind Gap sheet will embrace the eastern portion of the Northampton slate developments, and will not only be of value to the people there, but is needed in view of the completion of the geologic work now under way in the slate region. The Hanover sheet is in York and Adams counties, and lying between the finished Gettysburg and York quadrangles, will complete the mapping in that area.

USE OF TRIANGULATION STATIONS.

In the southwestern portion of the State, in the Pittsburgh Coal Field, a most extensive use has been made of the accurate triangulation system, which is the foundation of our topographic mapping.

TOPOGRAPHIC AND GEOLOGIC SURVEY OF PENNSYLVANIA
GEORGE W. McNEES, ANDREW S. McCREATH, E. V. D'INVILLIERS, COMMISSIONERS.
RICHARD R. HICE, STATE GEOLOGIST

PLATE I



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INDEX MAP OF TRIANGULATION STATIONS AND LINES OF PRIMARY TRAVERSE.

In the counties of Greene, Washington, Allegheny, Fayette and Westmoreland there have been established, in the progress of the work, many accurately located stations. The exact location of these stations, the distances which separate them, and the angular bearing of the several stations, have been accurately determined by a system of triangulation.

Originally this work was based on the Trans-Continental Triangulation Net of the United States Coast Survey, and was extended north and westward from stations in Maryland. In the progress of the work a base line was measured in Westmoreland County, and the distances as shown by calculation were checked by accurate measurements on this base. The whole triangulation net was again tied along the southern boundary of the State to the Trans-Continental Net of the Coast Survey.

To ensure greater accuracy in its work in the several portions of the Pittsburg Coal Field, one of the larger coal companies conceived the idea of tying all its engineering work to the accurately determined triangulation stations in the several counties named. As the work of the private surveys progressed independent computation of the distances separating some of these stations was made by the local engineers, showing an apparent discrepancy of about 1 foot in 4,000 in the distances as determined by the triangulation net.

In the spring of 1914 it was deemed advisable to determine whether this discrepency actually existed, and accordingly a base line was accurately measured along the Wabash Railroad, near Carnegie, Allegheny County, and several points were occupied by triangulation. This work was done with unusual care.

In the measuring of the base line, after making the proper corrections for variations in temperature, the measurements agreed very closely. The variation, without the several corrections being made, in a distance of 7,000 feet, was but .200ths of an inch, and when the correction for temperature was applied this small variation almost entirely disappeared.

In the measurement of the angles two theodolites were used, reading to 2 seconds of arc. The result of this examination shows that the error in the distances of the triangulation net in the western portion of the State does not exceed 1 part in 16,000—one half mile in the diameter of the earth—a degree of accuracy so far within the limits of ordinary engineering work as to be considered absolutely accurate. This is only mentioned as one of the many practical uses which are being made of the topographic work.

The demand for topographic work is constantly increasing and is very far beyond the resources at the command of the Survey. There are at least a score of quadrangles where work is most urgently needed. The advantages and the value of this work have

made manifest in many ways, and in addition to the demand of the public for the topographic maps there is need for carrying on geologic work as well.

GEOLOGIC WORK.

Under the provisions of the contract with the United States Geological Survey, 31 quadrangles have been surveyed geologically, and reports have been issued on all but two. The field work on these five quadrangles was completed a number of years ago, but for various reasons the compilation of the reports, and the publication of the same by the United States Geological Survey, has been delayed.

It was expected two years ago that reports would have been issued upon all the remaining areas long before this time. It is believed that the reports on the remaining quadrangles will be completed within the coming year. This long delay in publication of results was one of the factors leading to the belief that geologic work by the State was desirable and necessary.

Since the beginning of geologic work by the State 12 reports have been submitted and placed in the hands of the Department of Printing and Binding for publication; 7 of them have been issued. It was necessary to revise one of them and the other four reports are still in the press. One of these reports was transmitted for publication in September, 1912, and when about completed was destroyed by the fire in the plant of the State Printer in April, 1914: A second one submitted in January, 1913 was also delayed by the same fire.

The first of these was a report embracing all the data of an engineering character which had developed during the progress of the topographic mapping, and which heretofore has been scattered through a number of publications of the United States Survey and of our own reports. The second report was a detailed review of the mineral production of the State, with special reference to the year 1911. This was designed as the first of a series of reports dealing with the mineral wealth of the State from year to year, and giving in detail the production of minerals so far as the same could be done without disclosing individual output. Both these reports will be issued shortly.

The other two reports are in process of printing, one on the Minerals of Pennsylvania, and the other a detailed report on the Broad-Top Coal Field of Huntingdon, Bedford and Fulton counties. These reports are about ready to issue. In addition to the reports mentioned work has been continued on the slate industry in the Slatington Region, and the manuscript of this report will soon be submitted.

A somewhat detailed progress map is almost completed, covering the southwestern portion of the State, showing in detail the geology of that area on a base of much greater accuracy than any heretofore used. On it have been shown structural contours on the horizon of the Pittsburgh coal over an area of about 6,000 square miles, exhibiting the relation of the several coal areas to the structural axes, and also the intimate relation of structure to the various oil and gas fields. It is expected this map will be ready to go to the printer during the present summer.

Work is continuing on the clays of the State and a report on a portion of the same, embracing the work of the coming field season, will be ready for printing by the close of the year.

The data covering the mineral production of the State for the year 1912 has been compiled, and the same apears as an appendix to this report.

There will also be found in an appendix a short account of the copper deposits in Adams and Franklin counties. The continued investment of money and labor in the South Mountain area in the search for copper made necessary a short statement regarding the possibilities of finding this metal in paying quantities, in such form as to be available to the people of the State.

The short report accompanying this volume is based upon previous work by several investigators, freely drawn upon, and a few days spent in the region to check up any changes which have occurred since the publication of the last reports. While this report is in no sense exhaustive, it makes clear the fact that no one should invest time or money in the search for copper in this area without realizing that all labor in the past has been in vain, and that there seems little reason to expect more favorable results from further explorations.

No provision has been made for the publication by the State of the result of the co-operative geologic work. The results of this work are scattered through a number of publications of the United States Geological Survey, a complete list of which will be found in an appendix to this report.

The report on the mineral production of the State for 1913 is rapidly approaching completion. Pennsylvania produces almost one-fourth of the entire mineral output of the United States, and has a correspondingly large number of producers. While many of these are quite small yet, in the aggregate, the output of these small pro-

[illegible] large. The information obtained from this work, which [illegible] in cooperation with the United States Geological Survey, [illegible] great and growing importance. Aside from the details which [illegible] published, showing the output by district or by counties, as [illegible] may be, the actual details of production are of great importance for future geologic work.

Under the arrangements with the National Survey the expense to [illegible] is quite small. The many thousands of requests for information are sent out directly by the United States Geological Survey, and the returns are made to the State Geologist, who in turn forwards them to the United States Survey. The saving by this cooperative arrangement in printing, in clerical work and more especially in postage, is very large and amounts to several times the expense to this Survey in other directions. In addition to the printed reports which can only be issued after all the figures have been received, tabulated and compiled, data regarding the mineral products are sent to the newspapers in the counties where such products are produced as rapidly as the figures are completed, thus furnishing detailed advance information of the output to those most interested. A series of short statements of the mineral production of each of the counties is also furnished as soon as the same may be compiled from the completed reports.

In addition to the work above mentioned there is a large and ever increasing amount of labor involved in answering inquiries for information, many of which come from parties outside of our State, who are interested either in purchasing our products or in a permanent location within the State for their business. These inquiries can often be answered without investigation, but many of them require the examination of reports or correspondence with some person or persons who may be conversant with the particular subject. Including the reports on mineral production, all of which require attention, the incoming and outgoing mail in the office of the State Geologist for each of the past two years has averaged [illegible] pieces.

There is no better method of judging the necessity of geologic [illegible] than by considering the value of the mineral products. Viewed [illegible] the necessity for this class of work in Pennsylvania is more pressing than in any other portion of the United States.

The average value of the mineral production of the United States in 1912 was $530 per square mile of area. There were 8 States where the average production was more than $1,000 per square mile. Of these 8 States 7 are east of the Mississippi River, and these 7 States produced in 1912 over one-half in value of the total mineral output of the United States, and of the output of these 7 States Pennsylvania produced 46.4 per cent., or 23.2 per cent. of the total output of the United States.

The area, total value of the mineral production, and the average per square mile for the year 1912 of these 7 States lying east of the Mississippi, are shown by the following table.

Area and Production of Seven Leading States.

State.	Area, square miles.	Value of production.	Value per square mile.
		1912.	1912.
Indiana,	36,354	$42,239,193	$1,162
Michigan,	57,980	80,062,486	1,382
Illinois,	56,665	123,068,867	2,172
Ohio,	41,040	111,229,650	2,710
New Jersey,	8,224	36,881,930	4,484
West Virginia,	24,170	123,872,358	5,125
Pennsylvania,	45,126	445,790,022	9,881
Total (7 states),	.....	$963,144,506	.....
United States,	3,026,789	$1,917,818,053	$630

New York on the north of Pennsylvania, and Maryland on the south, are not included in the above table. The production of these States in 1912 was as follows:

Area and Production of New York and Maryland.

State.	Area, square miles.	Value of production.	Value per square mile.
		1912.	1912.
New York,	49,204	$38,406,473	$780
Maryland,	12,327	10,916,671	886

When we compare the aid and assistance this and our adjoining States are giving toward the development and production of their respective minerals, Pennsylvania is clearly deficient and the significance of this fact is not creditable.

In the following table the area of Pennsylvania and its adjoining States, the appropriation for geologic and topographic work, and the appropriations per square mile of area, are shown:

Area and Appropriation for Geologic Work of Pennsylvania and Adjoining States.

State.	Area.	Appropriation.	Appropriation per square mile of area.
New York,	49,204	$28,260*	$0.57
New Jersey,	8,224	16,500†	2.00
Maryland,	12,327	15,000‡	1.22
West Virginia,	24,170	29,900	1.24
Ohio,	41,040	32,000	.78
Pennsylvania,	45,126	15,000	.33

*Salaries only. Does not include topography.
†State entirely surveyed topographically.
‡Topography contributed to by Highway Department, State Weather Service and Forestry Bureau.

The following table gives the appropriation for geologic and topographic work, the total mineral production, and the amount of appropriation per $1,000 of mineral output in Pennsylvania and adjoining States in 1912.

Appropriation and Mineral Production of Pennsylvania and Adjoining States.

State.	Appropriation.	Value of mineral production.	Appropriation per $1,000 of mineral production.
New York,	$28,260*	$38,406,473	$3.35
New Jersey,	16,500†	36,881,930	0.45
Maryland,	15,000‡	10,916,671	1.37
West Virginia,	29,900	123,872,358	0.24
Ohio,	32,000	111,229,656	0.29
Pennsylvania,	15,000	445,750,022	0.034

*Salaries only. Does not include topography.
†State entirely surveyed topographically.
‡Topography contributed to by the Highway Department, State Weather Service and Forestry Bureau.

From the above comparisons it will be seen that while Pennsylvania produces per square mile 19 times the average for the United States, and almost twice the amount per square mile of the next highest State; yet when compared with our adjoining States we are at the bottom of the list in every way as regards aid from the State. Compared with our production we expend in the encour-

agement of our mining industries, but one-eighth as much as West Virginia, one-ninth as much as Ohio, one-fourteenth as much as New Jersey, one-fortieth as much as Maryland, and only one per-cent of the amount expended by New York.

Just as the natural wealth of the State is exhausted does the necessity for the conservation of the remaining resources become more imperative. Conservation does not mean prohibition; it is use without waste. It does not mean the setting aside of any fixed portion for the future; the future is only entitled to that which remains after intelligent use by the present of what is received by us from the past.

If the past was wasteful it has certainly given us a vast heritage in the wealth and prosperity of the present, but to continue and maintain our high ranking position we must not recklessly or wastefully use the resources which remain. Conservation is a relative term, and so is waste. What is waste under one condition may be intelligent use under others, and what is conservation in Pennsylvania may be, and probably is, prohibition in other portions of the country. Just as the resources of Nature are developed and used the possibility and necessity of ever increasing saving becomes apparent; and as regards the mineral wealth of our own State, and the continuance of profitable production, the work of the geogolist is necessary and should be liberally supported.

The figures given in an appendix to this report show that Pennsylvania produces one-half million tons of bituminous coal each working day, a quantity we cannot appreciate, and equivalent to the exhaustion of 30,000 acres per year. That careful and detailed study of our own several coal regions will result in great savings, in lessening the cost of operation, and also in increasing the production per unit of area, is generally conceded. It is also known that all such work can only be done by the State. Similar conditions exist regarding other mineral products—all of which emphasize the demand for, and necessity of, geologic work commensurate with resources and production.

APPENDIX A.

Publications of the Pennsylvania Surveys and of the United States Geological Survey Relating to Pennsylvania.

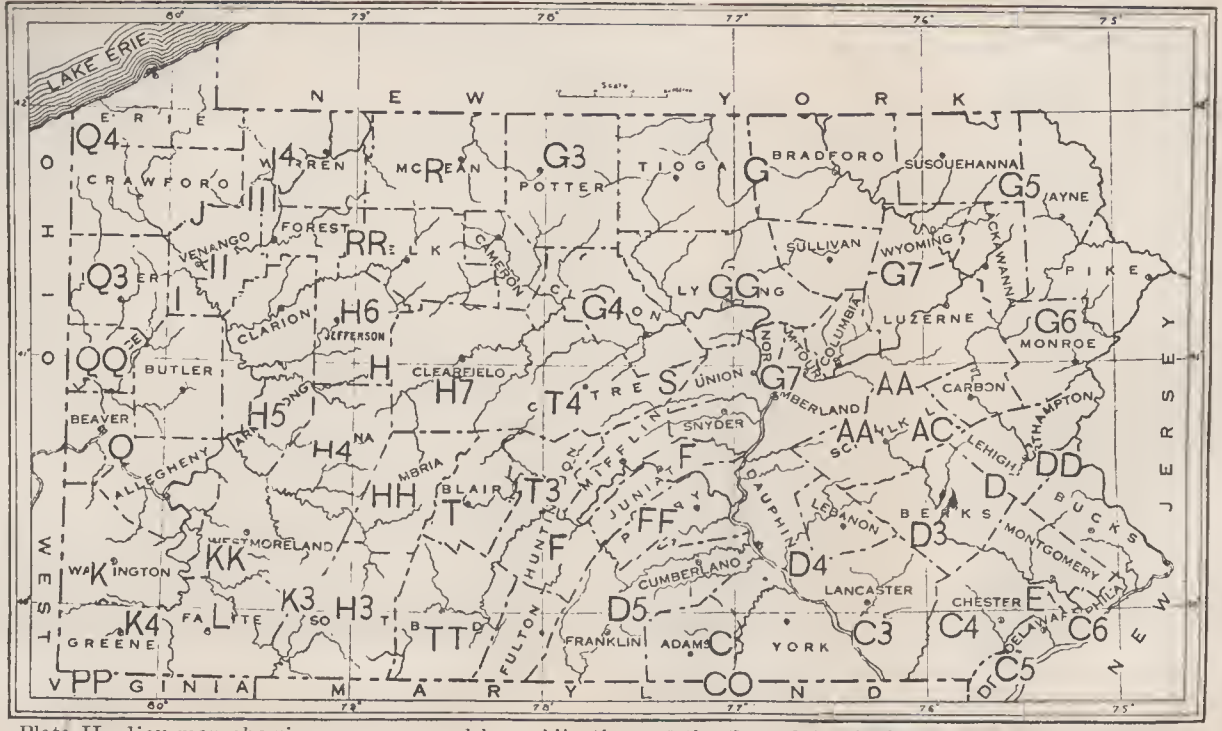

Plate II. Key map showing areas covered by publications of the Second Geological Survey of Pennsylvania

APPENDIX A.

PUBLICATIONS OF THE PENNSYLVANIA SURVEYS AND OF THE UNITED STATES GEOLOGICAL SURVEY RELATING TO PENNSYLVANIA.

FIRST GEOLOGICAL SURVEY.

None of the reports of this survey are available for distribution. They have long been out of print and can only be had from dealers in second hand books.

SECOND GELOGICAL SURVEY.

The reports of this survey are also out of print and neither the present survey nor other departments of the State Government has the same for distribution. For convenience the following list of the publications of the Second Geological Survey, and Index Map showing the area covered by each is here given. The reports can generally be had from dealers in second hand books.

Annual Reports.

1885—769 pp. 8 pl., with Atlas, contains following special reports:

1. Oil and Gas. John F. Carll.
2. Vegetable Origin of Coal. Leo Lesquereux.
3. Pittsburg Coal Region. E. V. d'Invilliers.
4. Wellersburg Coal Basin. J. P. Lesley and E. B. Harden.
5. Tipton Run Coal Basin. C. A. Ashburner.
6. Anthracite Coal Region. C. A. Ashburner.
7. Wyoming Valley Fossils. C. A. Ashburner and A. Heilprin.
8. Bernice Coal Basin. C. A. Ashburner.
9. Mehoopany Coal Field. F. A. Hill.
10. Cornwall Ore Mines. J. P. Lesley and E. V. d'Invilliers.
11. Delaware and Chester Kaolins. J. P. Lesley and C. A. Ashburner.
12. Quarternary Geology, Wyoming Valley. C. A. Ashburner, F. A. Hill and H. C. Lewis.
13. Pressure, &c., of Rock Gas. J. P. Lesley.
14. Progress Geodetic Survey. Mansfield Merriman.

1886—4 parts as follows:

i. Pittsburgh Coal Region. E. V. d'Invilliers.

ii. Oil and Gas Region. J. F. Carll, F. C. Phillips, B. S. Lyman.

iii. Anthracite Coal Region with Atlas. F. A. Hill.

iv. 1. The Lehigh River Cross Section. Arthur Winslow.

2. Paint Ores Along the Lehigh River. F. A. Hill.

3. Iron Ore Mines and Limestone Quarries of the Cumberland-Lebanon Valley. E. V. d'Invilliers.

4. Geology of Radnor Township, Delaware Co., &c., T. D. Rand. With an Atlas.

1887—105 pp. map New Boston Anthracite Basin.

1. Cave Fossils. Prof. Joseph Leidy.

2. Fossil Tracks in the Trias. Atreus Wanner.

3. New Boston Anthracite Basin. Benj. Smith Lyman.

4. State Line Serpentine. Prof. F. D. Chester.

Miscellaneous Reports.

A. A History of First Geological Survey of Pennsylvania, from 1836 to 1858, J. P. Lesley; with annual reports of Board to Legislature for 1874 and 1875. 226 pp. 1876.

B. Minerals of Pennsylvania, F. A. Genth; hydro-carbon compounds, S. P. Sadtler; reference map. 206 pp. 1875.

B2. Minerals, F. A. Genth, continued from page 207 to 238. 31 pp. 1876. (Bound with B.)

M. Chemical Analyses in 1874-5, A. S. McCreath. 105 pp. 1875.

M2. Chemical Analyses in 1876-8, A. S. McCreath; Classification of coals, P. Frazer; Fire-brick tests, F. Platt; Dolomitic limestone Beds, J. P. Lesley; Utilization of Anthracite Slack, F. Platt; Determination of Carbon in Iron or Steel, A. S. McCreath. 1 folded pl., 4 page pls. 438 pp. 1879.

M3. Chemical Analyses in 1879-80, A. S. McCreath; reference map of 93 iron ore mines in Cumberland Valley. 126 pp. 1881.

N. Levels above tide of railroads, canal and turnpike stations, mountain tops, &c., in and around Pennsylvania, 200 tables, C. Allen; map. 279 pp. 1878.

O. Catalogue of specimens collected by survey (No. 1 to 4,264), C. E. Hall. 217 pp. 1878.

O2. Catalogue (continued from No. 4,625 to No. 8,974); also catalogue of fossils (pp. 231 to 239). 272 pp. 1880.

O3. Catalogue (continued from No. 8,975 to No. 12,872); also catalogue of special collections of fossils in stratigraphical order, from 201-1 to C7-4-3; and Revised Catalogue of Randall's collection, from 9,467 to 9,625. 260 pp. 1889.

P. Coal Flora of Pennsylvania and the United States. Vols. 1 and 2 (bound together), L. Lesquereux. 694 pp. 1880.

P. Coal Flora of Pennsylvania and the United States. Vol. 3, 24 double page pls, (lithographed) of coal plants, to accompany P., vols. 1 and 2. 283 pp. 1884.

(P). Atlas of 87 double page pls. (lithographed) of coal plants to accompany P., vols. 1 and 2. 1879.

P2. Permo-Carboniferous plants from W. Va. and Greene county, Pa., W. M. Fontaine and I. C. White. 38 double page pls. (lithographed). 143 pp. 1880.

P3. Ceratiocaridae, C. E. Beecher; Eurypteridae, James Hall. 8 pls. 39 pp. 1884.

P4. Dictionary of Fossils found in Pa. and elsewhere, with electrotype illustrations of the various forms. 3 vols J. P. Lesley, pp. 1,283. 1889.

X. Geological Hand Atlas of the 67 counties of Pa., with short explanation of the geological structure of each county, embodying results of field work of the survey from 1874 to 1884, J. P. Lesley. 62 colored maps and cross section. 112 pp. 1885.

Z. Terminal Moraine across Pennsylvania, H. C. Lewis; extracts from descriptions of the Moraine in New Jersey, G. H. Cook, and in Ohio, Kentucky and Indiana, G. F. Wright. Map of State, 18 photographic views of the Moraine, and 32 page plate maps and sections. pp. lvi and 299. 1884.

Grand Atlas, Div. I, Pt. I, 1885, port-folio containing maps of 56 counties and parts of counties (scale 2 mi. to 1 inch) on 49 sheets (26″ x 32″).

Annual Report, Pt. IV. 1886.

Anthracite Region.

A2. Causes, kinds and amount of waste in mining anthracite, F. Platt; Methods of mining (1 chapter), J. P. Wetherill, illustrated by 35 figures of mining operations, plan of the Hammond breaker, and specimen sheet of the maps of the anthracite coal fields, 134 pp. 1881.

AC. Mining Methods, &c., in the anthracite coal fields, H. M. Chance. 54 pls. and 60 illustrations in text. 574 pp. 1883. Atlas containing 25 pls. illustrating coal mining.

AA. First report of progress of the anthracite survey; Panther Creek Basin, C. A. Ashburner; determination of the latitude and longitude of Wilkes-Barre and Pottsville, C. L. Doolittle; theory of stadia measurements, A. Winslow. 407 pp. 1883.

AA. Second report of progress of the anthracite survey, Pt. I; Statistics of Production and Shipment for 1883 and 1884, C. A. Ashburner.

(AA.) Atlas of Southern anthracite coal field, Pt. I, 13 sheets; 3 geographical and mine sheets, 3 cross section sheets, 3 columnar

section sheets, 1 topographical map sheet, and 1 coal bed area sheet, relating to the Panther Creek Basin; 1 general map of the anthracite region, and 1 chart of anthracite production from 1820 to 1881; C. A. Ashburner, A. W. Sheafer and F. A. Hill. 1882.

(AA.) Atlas Southern anthracite field, Pt. II, 13 mine sheets between Tamaqua and Tremont, F. A. Hill and A. D. W. Smith. 1889.

(AA). Atlas Southern anthracite field, Pt. III, 12 mine sheets between Tremont and western end of the southern basin, and a general map of the anthracite fields showing the location of collieries. F. A. Hill and A. D. W. Smith. 1889.

(AA). Atlas Southern anthracite field, Pt. IV. 2 vols.

(AA). Atlas Southern anthracite field, Pt. V.

(AA). Atlas Southern anthracite field, Pt. VI.

(AA). Atlas of Western Middle anthracite field, Pt. I, 11 sheets; 4 geological and mine sheets between Delano and Locust Dale, 3 topographical sheets between Quakake Junction and Mount Carmel, and 4 cross section sheets. C. A. Ashburner, A. W. Sheafer and Bard Wells. 1884.

(AA). Atlas of Western Middle anthracite field, Pt. II, 11 sheets; 4 geological and mine sheets from Mount Carmel to the western end of the coal field, and 7 columnar section sheets covering the entire field. F. A. Hill and Bard Wells. 1887.

(AA). Atlas of Western Middle anthracite field, Pt. III.

(AA). Atlas of Northern anthracite field, Pt. I, 6 geological and mine sheets between Wilkes-Barre and Nanticoke, 3 cross section sheets and 4 columnar section sheets, C. A. Ashburner and F. A. Hill. 1885.

(AA). Atlas of Northern anthracite field, Pt. II, 10 sheets; 4 mine sheets relating to that portion of the Wyoming-Lackawanna coal basin between Wyoming and Taylorville, and 2 topographical and mine sheets relating to the extreme western end of the Wyoming basin; 4 columnar section sheets of boreholes, shafts, and tunnels; F. A. Hill and William Griffith. 1887.

(AA). Atlas of Northern anthracite field, Pt. III, 8 sheets; 4 mine and 4 columnar section sheets relating to that portion of the Lackawanna basin in the vicinity of Taylorsville, Minooka, Scranton, Dunmore and Priceville; F. A. Hill and William Griffith. 1889.

(AA). Atlas of Northern anthracite field, Pt. IV, 8 mine sheets relating to that portion of the Lackawanna basin in the vicinity of Olyphant, Peckville, Jessup, Winton, Archbald, Jermyn, Glenwood, Carbondale, and Forest City in Lackawanna and Susquehanna counties; F. A. Hill and William Griffith, 1889.

(AA). Atlas of Northern anthracite field, Pt. V.

(AA). Atlas of Northern anthracite field, Pt. VI.

(AA). Atlas Eastern Middle anthracite field, Pt. I, 8 sheets; 2 geological and mine sheets in the vicinity of Hazleton, Drifton and surrounding towns, 3 cross section sheets and 3 columnar section sheets; C. A. Ashburner, A. P. Berlin and Arthur Winslow. 1885.

(AA). Atlas of Eastern Middle anthracite field, Pt. II, 8 sheets; 6 mine and 2 columnar section sheets relating to portions of the Lehigh basins in the vicinity of Upper Lehigh, Pond Creek, Sandy Run, Eckley, Weatherly, Buck Mountain, Beaver Meadow, Colerain, Jeansville and Audenried, in Luzerne, Carbon and Schuylkill counties; F. A. Hill and I. R. Moister. 1888.

(AA). Atlas Eastern Middle anthracite field, Pt. III, 13 sheets; 8 mine sheets, covering the entire western part of the field, 2 columnar section sheets and 3 cross section sheets; F. A. Hill and I. R. Moister. 1889.

Grand Atlas, Div. II, Pt. I. 1884. Port-folio containing 26 sheets (26″ x 32″), as follows: 13 sheets Atlas Southern Anthracite Field, Pt. I, 11 sheets Atlas Western Middle Anthracite Field, Pt. I, 1 sheet photo views of plaster models in Western, Middle and Southern Fields, and 1 specimen sheet, Report A2.

Grand Atlas, Div. II, Pt. II, 1885. Port-folio containing 22 sheets (26″ x 32″), as follows: 13 sheets Atlas Northern Anthracite Field, Pt. I, 8 sheets Atlas Eastern Middle Anthracite Field, Pt. I, and 1 sheet containing a preliminary general map of the Anthracite Coal Fields and adjoining counties.

For anthracite coal in Sullivan county, see G2 and Annual Report, 1885.

For Utilization of anthracite slack, see M2.

For general description anthracite region, Quaternary Geology of the Wyoming-Lackawanna Valley, &c., &c., see Annual Report, 1885.

Annual Report, Pt. III. 1886.

Bituminous Coal Fields and Surrounding Areas.

H. First report on Clearfield and Jefferson counties, F. Platt. 8 maps, 2 sections, 139 cuts in text. 296 pp. 1875. (For second report, see H 6, H 7.)

H 2. Cambria county, F. & W. G. Platt. 4 maps and sections, and 84 cuts in text. 194 pp. 1877.

H 3. Somerset county, F. & W. G. Platt. 6 maps and sections and 110 cuts in text. 348 pp. 1877.

Atlas to reports H2 and H3 containing geological maps of Cambria and Somerset counties, with 2 sheets of columnar sections and 1 cross section; a revision and correction of the semi-bituminous coal section of Wellersburg, Somerset county, and notes on the new mines in Cambria county. 1889.

Straight Creek coal basin; 2 sheets oil well sections; and 1 sheet coal sections.

V. N. Butler county; and (Pt. II) special report on the Beaver and Shenango river coal measures, H. M. Chance. Colored geological map of N. Butler; contour local map around Parker; map of the anticlinal rolls in the 6th basin; chart of the Beaver and Shenango rivers; profile sections from Homewood to Sharon; oil well records and surface sections; and 154 cuts in text. 248 pp. 1879.

V 2. Clarion county, H. M. Chance. Colored geological county map; map of the anticlinals and oil belt; contoured map of the old river channel at Parker; 4 page plates, and 83 cuts in text. 232 pp. 1880.

For the coal basins of Bradford and Tioga counties, see report G.

For the coal basins of Lycoming and Sullivan, see report G 2.

For the coal basins of Potter county, see G 3.

For the coal basins of Clinton county, see G 4.

For the coal in Wayne county, see G 5 and Northern Atlas, Part IV.

For the East Broad Top coal basin in Huntingdon county, see F.

For the mountain coals in Blair county, see T.

For the Broad Top coal measures in Bedford and Fulton counties, see T 2.

For the coal basins in Centre county, see T 4.

For coal analyses, see M, M 2, M 3.

For classifications of coals, see M 2.

For coal plants, see P, P 2.

For fossil crustaceans in coal slate, see P 3.

For origin of coal; Pittsburg Region and Monongahela Valley; Wellersburg coal basin, Somerset county; and Tipton Run coal beds, Blair county; see Annual Reports, 1885, and Atlas H 2 and H 3.

Grand Atlas, Div. III, Pt. I, 1885; port-folio containing 35 sheets (26″ x 32″), as follows: 32 sheets relating to portions of the Petroleum and Bituminous Coal Fields, and 3 sheets relating to the Quaternary period.

Annual Report, 1886. Part I.

Petroleum and Gas.

See reports I, I 2, I 3, I 4, and J, under Bituminous Coal Fields.

See L for the Pittsburgh gas well, and the use of gas in iron manufacture.

See Q, Q 2, Q 3, Q 4, for references to oil rocks in Beaver, Lawrence, Mercer, Crawford, Erie and S. Butler counties.

See K for the Dunkard Creek oil wells of Green county.

See R, R 2, for descriptions of oil rocks in McKean, Elk and Forest counties.

See V, V 2, for notes on the oil rocks of N. Butler and Clarion counties.

See H 2 for oil boring at Cherry Tree, Cambria county.

See G 5 for oil boring in Wayne county.

See Annual Report, 1885, for report of progress in the oil and gas region, with special facts relating to the geology and physics of natural gas.

See Grand Atlas, Div. III, Pt. I, under Bituminous Coal Fields.

See Annual Reports, 1886. Part II.

Northeastern and Middle Pennsylvania.

(Palaeozoic formations from the Coal Measures down.)

D. First report on Lehigh county iron mines, F. Prime. Contour line map of the ore region and 8 page plates. 73 pp. 1875.

D 2. Second report on Lehigh county iron mines, F. Prime. Colored geological contour line map of the iron region (in 4 sheets), colored geological contour line map of the Ironton mines, 4 double page lithograph pictures of Limestone quarries, and 1 page plate of Monocraterion. 99 pp. 1878.

D 3. Vol. I. Lehigh and Northampton counties. Introduction by J. P. Lesley; Slate belt, R. H. Sanders; Limestone belt and iron mines, F. Prime; South Mountain rocks, F. Prime and C. E. Hall. 3 lithograph pictures of quarries, 4 pictures of triangulation stations, 14 page plates of sections, and an atlas of maps. 283 pp. 1883. (Note—For atlas, see below.)

D 3. Vol. II. Berks county (South Mountain belt), E. V. d'Invilliers. 10 pages plates of sections and Indian relics, and 3 pictures of rock exposures. 441 pp. 1883. (Note—For atlas, see below.)

(D 3.) Atlas; 1 colored geological map of Lehigh and Northampton counties (1 sheet); 1 colored geological contour line map of southern Northampton county (6 sheets); a contour line map of the mountains from the Delaware to the Schuylkill (18 sheets); colored geological contour line index map to the 22 sheets (1 sheet); and 4 sheets of maps of iron mines.

(D 5) Atlas of colored geological county maps of Cumberland, Franklin and Adams (3 sheets); and first installment of contour line map of the South Mountains, Sheets A 1, A 2, B 1, B 2 (4 sheets), A. E. Lehman.

(D 6) Atlas, South Mountain, continued.

F. Juniata River district in Mifflin, Snyder, and Huntingdon counties, J. H. Dewees; The Aughwick Valley and East Broad Top region in Huntingdon county, C. A. Ashburner. Colored geological maps of East Broad Top R. R. and Orbisonia vicinity (2 sheets); Three Springs map and section (2 sheets); Sideling Hill Creek map

and section (2 sheets), and Isometric projection at Three Springs (1 sheet); six folded cross sections, and 22 page plates of local maps and columnar sections. 305 pp. 1878.

F 2. Perry county (Pt. I, geology), E. W. Claypole. 2 colored geological maps of the county; 17 geological outline township maps as page plates, and 30 page plate cross and columnar sections. 437 pp. 1884.

F 3. Union, Snyder, Mifflin and Juniata counties, with descriptions of the Clinton Fossil Ore mines, Monellus Carbonate ore mines and Lewistown Limestone Quarries by E. V. d'Invilliers. Colored geological maps of Union and Snyder and of Mifflin and Juniata counties. 420 pp. 1891.

(F 3). Atlas, contour map and section Greenwood Furnace, contour map and section Monroe Furnace, contour geological map of Stone Mountain Fault, contour geological map of parts of Huntingdon, Mifflin, Centre and Union counties. Geological map of parts of Jackson and Barre townships. Cross sections of Seven Mountains.

G. Bradford and Tioga counties, A. Sherwood; report on their coal fields (including forks of Pine Creek in Potter county), F. Platt; report on the coking of bituminous coal, J. Fulton. (See L above). 2 colored geological county maps, 3 page plates, and 35 cuts in text. 271 pp. 1878.

G 2. Lycoming and Sullivan counties; field notes by A. Sherwood; coal basins by F. Platt. 2 colored geological county maps (of Lycoming and Sullivan); topographical map (in 2 sheets) of the Little Pine Creek coal basin; and 24 page plates of columnar sections. 268 pp. 1880.

G 3. Potter county, A. Sherwood; report on its coal fields, F. Platt. Colored geological county map, 2 folded plates and 2 page plates of sections. 121 pp. 1880.

G 4. Report on Clinton county, H. M. Chance, including description of the Renovo coal basin, C. A. Ashburner, and notes on the Tangascootac coal basin, F. Platt. Colored geological county map, 1 sheet of sections, local Renovo map, 6 page plates and 21 sections in text. 183 pp. 1880.

G 5. Susquehanna and Wayne counties, I. C. White. Colored geological map of the two counties and 58 cuts in text. 243 pp. 1881.

G 6. Pike and Monroe counties, I. C. White. 2 colored geological county maps (1 sheet Pike and Monroe and 1 sheet Wyoming); map of glacial scratches, and 7 small sections. Report on the Delaware and Lehigh Water Gaps, with two contoured maps and five sections of the gaps, H. M. Chance. 407 pp. 1882.

G 7. Wyoming, Lackawanna, Luzerne, Columbia, Montour and Northumberland counties (i. e., the parts lying outside of the anthracite coal fields), I. C. White. Colored geological map of these

counties (in 2 sheets), and 31 page plates in text. 464 pp. 1883. (Note—The colored geological map of Wyoming county is published in G 6.)

T. Blair county, F. Platt. 35 cuts in text and an atlas of maps and sections (see below). 311 pp. 1881.

(T) Atlas of colored geological contour line map of Morrison's Cove, Canoe Valley, Sinking Valley and country west to the Cambria county line (14 sheets); index map of the same (1 sheet); colored sections (2 sheets). 1881.

T 2. Bedford and Fulton counties, J. J. Stevenson. 2 colored geological maps of the two counties. 382 pp. 1882.

T 3. Huntingdon county, I. C. White. Colored geological map of the county, and numerious sections. 471 pp. 1885.

T 4. Centre county, E. V. d'Invilliers; also special report, A. L. Ewing, and extracts from report of Lyon, Shorb & Co., by J. P. Lesley, Colored geological map of the county, 13 page plates of local maps and sections, and 15 cuts in text. 464 pp. 1884.

For report on line of the Terminal Moraine, see Z.

Grand Atlas, Div. IV, Pt. I, 1885. Port-folio containing 43 sheets, as follows: 30 sheets relating to the Durham and Reading Hills and bordering valleys in Northampton, Lehigh, Bucks and Berks counties, and 13 sheets relating to the South Mountains in Adams, Franklin, Cumberland and York counties.

Grand Atlas, Div. V, Pt. 1, 1885. Port-folio containing 35 sheets, as follows: 29 sheets relating to the Topography and Geology of the Palaeozoic strata in parts of Cambria, Blair, Bedford, Huntingdon, Mifflin, Centre and Union counties, 5 sheets containing map and geological cross section along the east bank of the Susquehanna River, Lancaster county, and 1 sheet containing cross sections of the Philadelphia belt of the Azoic rocks.

For report on Cornwall Iron Ore Mines, Lebanon county, and the Tipton Run coal beds, Blair county, see Annual Report, 1885.

For report on the Iron Ore Mines and Limestone Quarries of the Cumberland-Lebanon Valley, and Paint-ore along the Lehigh River, see Annual Report, 1886, Part IV.

Southeastern Pennsylvania.

C. York and Adams counties, P. Frazer. 1 folded map of a belt of York county through York and Hanover, 6 folded cross sections, and 2 page plate microscopic slices of dolerite. 198 pp. 1876. (Note —The colored geological county map of York is published in the Atlas to C 3.)

C 2. York and Adams counties (South Mountain rocks, iron ores, etc), P. Frazer. 1 general map of the district, 10 folded cross

sections, and 5 page plates. 400 pp. 1877. (Note—The colored geological county map of Adams is published in D 5.)

C 3. Lancaster county, P. Frazer. 9 double page lithographic views of slate quarries and Indian-pictured rocks; 1 plate of impressions on slate, and 1 page plate microscopic section of trap, and an atlas. 350 pp. 1880.

(C 3) Atlas of 13 sheets: Colored geological map of York county; colored geological map of Lancaster county; Susquehanna River section. (Sheets 1, 1A, 2, 2A, 3, 4); Lancaster section; Pequea section; Muddy Run section; Chestnut Hill mines; Gap Nickel mine.

C 4. Chester county; general description, 214 pp., J. P. Lesley; Field notes on the townships, 139 pp., P. Frazer. Colored geological county map, photographic view of contorted schists, and 12 page plates. 394 pp. 1883.

C 5. Delaware county, C. E. Hall. Colored geological county map; 30 photographic page plate views of granite quarries, kaolin pits, etc., and 4 page plates of altered mica. 128 pp. 1885. See Annual Report, 1885, for Kaolin report.

C 6. Philadelphia and the southern parts of Montgomery and Bucks counties, C. E. Hall. Colored geological map of the belt of country between Trenton and Delaware county (in 3 sheets), a sheet of colored cross sections and 24 cuts in text. 145 pp. 1882.

(C 7) Atlas to report on Bucks and Montgomery counties, containing 12 sheets of topographical map of the Neshaminy, Tohickon and Perkiomen water basins by the Philadelphia Water Department on a scale of 1,600 feet to 1 inch, 1-19600 of nature. 1887.

E Part I Historical introduction to a report on the Azoic rocks, T. S. Hunt. 253 pp. 1878.

For report on the kaolin deposits of Chester and Delaware counties, see Annual Report, 1885.

For report on the Serpentines of Radnor township, Delaware Co., etc., see Annual, 1886, Part IV.

See also Grand Atlas, Div. V, Pt. I, under Northeastern and Middle Pennsylvania.

Summary Report.

Vol. I. Laurentian, Cambrian, Lower Silurian. J. P. Lesley, pp. 1-719, 1892.

Vol. II. Upper Silurian and Devonian. J. P. Lesley, pp. 721-1628, 1893.

Vol. III, part 1. Carboniferous. J. P. Lesley, E. V. d'Invilliers, and A. D. W. Smith, pp. 1629-2152, 1895.

Vol. III, part 2. Carboniferous, New Red. E. V. d'Invilliers and Benjamin Smith Lyman, pp. 2153-2638, 1895.

Atlas, Final Summary Report.

These volumes give in a condensed form a summary of practically all of the preceding publications, with some additional matter of later date, including a new geologic map of the State, a map and list of bituminous mines, and 611 page plates.

Index of Final Summary Report, Wm. A. Ingham, pp. 1-98, i-xxx. 1895.

TOPOGRAPHIC AND GEOLOGIC SURVEY.

GENERAL REPORTS.

Report of 1899 and 1900.

A report of 135 pages with the progress map of the State, showing the results of topographic work and also of the Co-operative Geologic Work.

Report of 1899-1906.

A report of 308 pages with an index map of the Topographic and Co-operative Geologic Work in the State. Contains a list of positions in the State determined by triangulation and by primary traverse; a list and a description of meridian lines and magnetic determinations by the United States Geological Survey and by the Coast and Geodetic Survey; a list of determined elevations within the State, and a list of published topographic atlas sheets.

Report of 1906-1908.

A report of 375 pages. Contains an index map of the State, showing the location of completed topographic surveys and of geologic folios. A map showing the location of the various triangulation stations in the State and the quadrangles with primary traverse control. A map showing the lines of the precise level net within the State. A list of the triangulation stations and positions determined by primary traverse during the time covered by the report, and a list of completed topographic maps. The major portion of the volume is a geologic report, giving a short account of the methods used by the United States Geological Survey within the State and the results of the co-operative geologic work within the State, with 21 plates and 21 figures, by Dr. Geo. H. Ashley, and others.

Report of 1908-1910.

Bringing the data obtained by primary control both horizontal and vertical, up to the first of June, 1910. A list of completed topographic maps and of the publications both of this Survey and of the United States Geological Survey relating to Pennsylvania. "A Preliminary List of the Fauna of the Allegheny and Conemaugh Series in Western Pennsylvania," by Dr. P. E. Raymond. A paper on "The Present Status of the Natural Gas Development in Pennsylvania Fields," by Mr. Frederick G. Clapp.

Report of 1910-1912.

A short account of the work of the Survey during the two years covered by the report. A list of the completed topographic maps. An index map and descriptive list of the publications of the Second Geological Survey of Pennsylvania. A list of the publications of the present Survey and a list of the publications of the United States Geological Survey relating to Pennsylvania Geology (mainly the result of work done in co-operation with the State organization). A preliminary report on the limestones of the York Valley Belt by M. L. Jandorf. A description of the little known Peridotite dike found in Fayette and Greene counties, by Lloyd B. Smith. A paper on the Geologic Origin of the Fresh water Fauna of Pennsylvania by Dr. A. E. Ortmann. A short compilation of the statistics of the mineral production of the State.

ECONOMIC REPORTS.

Report No. 1.

THE OIL AND NATURAL GAS RESOURCES OF THE SEWICKLEY QUADRANGLE, BY M. J. MUNN.

A detailed report on this subject in this quadrangle. This quadrangle has almost a hundred distinct oil and gas fields and pools, and the relation of structure to the various deposits forms a most interesting chapter. Perhaps the best worked out structure of any oil and gas field in this country.

Report No. 3.

THE OIL AND NATURAL GAS RESOURCES OF THE CLARION QUADRANGLE, BY M. J. MUNN.

A report on the oil and gas development in this quadrangle similar to that of the Sewickley quadrangle above mentioned.

Report No. 4.

THE PAINT ORES OF PENNSYLVANIA, BY BENJAMIN L. MILLER.

A detailed report of the various ores of the State used in paint manufacture and of the industry dependent thereon.

Report No. 5.

THE TALC AND SERPENTINES OF EASTERN PENNSYLVANIA, BY FREDERICK B. PECK.

A short account of these deposits bringing the present information up-to-date.

THE CEMENT INDUSTRY OF LEHIGH AND NORTHAMPTON COUNTIES, BY FREDERICK B. PECK.

An account of the materials and the industry in this great cement region. This is much more than a preliminary report.

Report No. 6.

THE GRAPHITE DEPOSITS OF PENNSYLVANIA, BY BENJAMIN L. MILLER.

A short report on this interesting subject. The demand for information along this line makes this report most timely.

PUBLICATIONS OF THE UNITED STATES GEOLOGICAL SURVEY RELATING TO PENNSYLVANIA.

A detailed list of publications of the National Survey, relating to Pennsylvania geology, will shortly be issued. Most of these reports are the result of co-operative work, the State Survey paying one-half of the cost of preparing the same, they are only issued, however, by the United States Geological Survey and can only be had by application to the Director of that Survey.

REPORTS IN PRESS.

Report No. 7.

ENGINEERING DATA.

A volume bringing together the data relating to the primary control work within the State, of interest to engineers. Map showing the location of the several Triangulation Stations within the State and the lines of primary traverse. A list of the Triangulation Stations and the available data concerning the same. A map showing the Primary and Precise level lines within the State and a list of the bench marks and other points whose elevation has been determined. A map showing the names adopted for each of the Quadrangles within the State and those designated where the topographic maps have been issued. A list and description of the Meridians established and other magnetic determinations in the State.

Report No. 8.

THE MINERAL PRODUCTION OF PENNSYLVANIA, 1911.

A detailed report on the production of the several mineral products of the State, giving not only the totals for the entire State but the production by counties. This is the first of a series of reports that will deal with the outpnt of the mineral wealth of the State from year to year.

Report No. 9.

THE MINERALS OF PENNSYLVANIA, BY AMOS P. BROWN AND FREDERICK EHRENFELD.

This report gives a short accomnt of the minerals of present valne in the State and also of those which may become of importance in the future. It is non-technical in character and has been prepared to comply with the numerous requests for a report of this character.

Report No. 10.

THE BROAD-TOP COALFIELD, BY JAMES H. GARDNER.

The report on this unique and most interesting coalfield has been completed and the report is in press. It describes the region in detail, the several coals present, the possibilities of other coal beds

of commercial value, the past development of the field and the future possibilities, showing that a large amount of coal remains to be mined, notwithstanding the very limited area of the field.

GENERAL GEOLOGIC MAP OF THE BROAD-TOP COALFIELD.

A detailed geological map of the Broad-Top Coalfield on a scale of 2,000 feet per inch. Showing the areas occupied by the several coal beds, the unique mesa-like structure of the field, the location of the several mines, active and abandoned, the relation of the field to lines of transportation. This map is the result of the geological work of the present Survey, and clearly shows the importance of this field. The base is by far the most accurate one of the region, being from detailed land maps, checked by the work in the field and the whole adjusted to the adjoining topographic work of the Survey on the north and west of the field.

REPORTS IN PROGRESS.

THE SLATE INDUSTRY IN THE SLATINGTON DISTRICT, BY A. P. BERLIN.

This report is rapidly approaching completion. This report will cover the slate industry in all its phases in that portion of the slate belt lying near Slatington. This is not only a region of very great geological interest and of complicated structure, but one of large economic importance. The slate industry in Pennsylvania is a large one and the necessity of detailed study of the structure and of the economic features of the production of slate is pressing. It is the intention to follow this report with a study of the other producing areas in the Slate Region so that the relations of the different parts may be made clear and the geology of the whole area brought into harmony with adjoining sections.

A PROGRESS MAP OF SOUTHWESTERN PENNSYLVANIA.

It has been a number of years since the publication of the general geological map of the State. The present map is designed to cover a portion of the State with more detail than formerly on a general map. The base used is of much greater accuracy than any map heretofore issued of any large portion of the State, and the geology will be shown with much greater detail. Structural contours on the

horizon of the Pittsburgh coal over an area of about 6,000 square miles, will show the relation of the several axes and their relation to the workable coal deposits, and also the intimate relation of structure to the several producing oil and gas fields.

THE CLAY INDUSTRY.

Work is in progress towards the preparation of a report on the clays and the clay industry of the State. The subject in this State is a very large one and the first report will be confined more especially to the fire clay producing portions of the State. Especial attention will be given to the refractory industry, in which line this State leads, but the other allied clay industries will be treated fully.

THE MINERAL PRODUCTION OF PENNSYLVANIA, 1912.

The data covering the output of minerals for 1912 will be compiled in the same detailed manner as for the 1911 report, and will appear as an appendix to the Bi-ennial Report for the years 1912-1914.

Report of 1912-1914.

This report will contain a brief account of the work of the two years both topographically and geologically, bringing up to date the data contained in Report No. 7. Appendices to the same will give in detail the output of minerals in the State for the year 1912, comparisons being made with other years to show the progress of the several industries. A brief account will be given of the present status of the copper developments in Adams county. Other short geological papers will give brief accounts of geological investigations under way.

THE MINERAL PRODUCTION OF PENNSYLVANIA, 1913.

The figures of production for the year 1913 are being rapidly collected and as soon as compiled a detailed report will be prepared and issued.

PUBLICATIONS OF THE UNITED STATES GEOLOGICAL SURVEY.

The results of the geological work done in co-operation with the United States Geological Survey, except as noted above, are published by the National Survey only.

The following is a list of the publications relating to Pennsylvania geology and all requests for the same should be made to The Director United States Geological Survey, Washington, D. C.

Folios.

Masontown-Uniontown folio, Pennsylvania, description by M. R. Campbell. Geologic Atlas U. S. folio 82, 1902.

Gaines folio, Pennsylvania-New York, description by M. L. Fuller, Geologic Atlas U. S., folio 92, 1903.

Elkland-Tioga folio, Pennsylvania-New York, description by M. L. Fuller and W. C. Alden. Geologic Atlas U. S., folio 93, 1903.

Brownsville-Connellsville folio, Pennsylvania, description by M. R. Campbell. Geologic Atlas U. S., folio 94, 1903.

Indiana folio, Pennsylvania, description by G. B. Richardson. Geologic Atlas U. S., folio 102, 1904.

Latrobe folio, Pennsylvania, description by M. R. Campbell. Geologic Atlas U. S., folio 110, 1904.

Kittanning folio, Pennsylvania, description by Charles Butts. Geologic Atlas U. S., folio 115, 1904.

Waynesburg folio, Pennsylvania, description by R. W. Stone. Geologic Atlas U. S., folio 121, 1905.

Elders Ridge folio, Pennsylvania, description by R. W. Stone. Geologic Atlas U. S., folio 123, 1905.

Rural Valley folio, Pennsylvania, description by Charles Butts. Geologic Atlas U. S., folio 125, 1905.

Ebensburg folio, Pennsylvania, description by Charles Butts. Geologic Atlas U. S., folio 133, 1905.

Beaver folio, Pennsylvania, description by L. H. Woolsey. Geologic Atlas U. S., folio 134, 1905.

Amity folio, Pennsylvania, description by F. G. Clapp. Geologic Atlas U. S., folio 144, 1907.

Rogersville folio, Pennsylvania, description by F. G. Clapp. Geologic Atlas U. S., folio 146, 1907.

Accident-Grantsville folio, Pennsylvania-Maryland-West Virginia, description by G. C. Martin. Geologic Atlas U. S., folio 160, 1909.

Philadelphia folio, Pennsylvania-New Jersey-Delaware, description by F. Bascom, W. B. Clark, N. H. Darton, H. B. Kummel, R. D. Salisbury, B. L. Miller and G. N. Knapp. Geologic Atlas U. S., folio 162, 1909. Covers Norristown, Philadelphia, Chester and Germantown quadrangles.

Mercersburg-Chambersburg folio, Pennsylvania, description by George W. Stose. Geologic Atlas U. S., folio 170, 1909.

Warren folio, Pennsylvania-New York, description by Charles Butts. Geologic Atlas U. S., folio 172, 1910.

Johnstown folio, Pennsylvania, description by W. C. Phalan. Geologic Atlas U. S., folio 174, 1910.

Sewickley folio, Pennsylvania, description by M. J. Munn. Geologic Atlas U. S., folio 176, 1911.

Burgettstown-Carnegie folio, Pennsylvania, description by E. W. Shaw and M. J. Munn. Geologic Atlas U. S., folio 177, 1911.

Foxburg-Clarion folio, Pennsylvania, description by E. W. Shaw, E. F. Lines and M. J. Munn. Geologic Atlas U. S., folio 178, 1911.

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Mineral resources of Johnstown, Pennsylvania and vicinity, by W. C. Phalen and Lawrence Martin. Bull. No. 447, 1911. 142 pp. 7 pls.

Coal, oil and gas of the Foxburg quadrangle, Pennsylvania, by E. W. Shaw and M. J. Munn. Bull. No. 454, 1911. 85 pp., 10 pls.

Oil and gas fields of the Carnegie quadrangle, Pennsylvania, by M. J. Munn. Bull. No. 456, 1911. 99 pp., 5 pls.

Magnetite deposits of the Cornwall type in Pennsylvania, by A. C. Spencer. Bull. No. 359, 1908. 102 pp., 2 pls.

Copper deposits of the Appalachian States by W. H. Weed. Bul. No. 455, 1911. 166 pp., 6 pls.

On the fossil faunas of the Upper Devonian, by H. S. Williams. Bull. No. 3, 1884. 36 pp.

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The Devonian system of eastern Pennsylvania and New York, by C. S. Prosser. Bull. No. 120, 1894. 81 pp., 2 pls.

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The Glacial boundary in western Pennsylvania, Ohio, Kentucky, Indiana and Illinois, by G. F. Wright. Bull. No. 58, 1890. 112 pp., 8 pls.

Results of spirit leveling in Pennsylvania for the years 1899 to 1905, inclusive, by S. S. Gannett and D. H. Baldwin. Bull. No. 288, 1906. 62 pp.

Notes on Explosive mine gases and dusts, with special reference to explosions in the Monongah, Darr and Naomi mines, by T. R. Chamberlin. Bull. No. 383, 1909. 67 pp.

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Recent work in the Bituminous Coal Fields of Pennsylvania, by M. R. Campbell. Bull. No. 213.

The Barnesboro-Patton Coal Field of Central Pennsylvania, by J. S. Burrows. Bull. No. 225.

The Elders-Ridge Coal Field, Pennsylvania, by R. W. Stone. Bull. No. 225.

Coal mining along the southeastern margin of the Wilmore basin, Cambria county, Pennsylvania, by Charles Butts. Bull. No. 225.

Pittsburg coal in the Burgettstown quadrangle, Pennsylvania, by W. T. Griswold. Bull. No. 260.

Clearfield Coal Field, Pennsylvania, by G. H. Ashley. Bull. No. 285.

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Brownstones of Pennsylvania, T. C. Hopkins. Eighteenth Annual Rept., Pt. V, 1897.

Cement-rock deposits of the Lehigh district, E. C. Eckel. Bull. 225.

Cement resources of Pennsylvania, by E. C. Eckel. Bull. No. 243.

Ganister in Blair county, by Charles Butts. Bull. No. 406.

Ganister in Blair county, by Charles Butts. Bull. No. 380.

Slate Deposits and Slate Industry of the United States, T. N. Dale. Bull. 275.

The slate industry of Slatington, Pennsylvania and Martinsburg, West Virginia, T. N. Dale. Bull. 213.

White clays of South Mountain, G. W. Stone. Bull. 315.

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Barite in southern Pennsylvania, by G. W. Stose. Bull. No. 225.

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The Jauss iron mine, Dillsburg, Pennsylvania, by A. C. Spencer. Bull. No. 430.

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Mineral paint ores of Lehigh Gap, E. C. Eckel. Bull. 315.

Ocher deposits of eastern Pennsylvania, by J. C. Stoddard and A. C. Callen. Bull. No. 430.

Paint ores near Lehigh Gap, Pennsylvania, by F. T. Agthe and J. L. Dynan. Bull. No. 430.

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The Nineveh and Gordon oil sands in western Greene county, Pennsylvania, F. G. Clapp. Bull. 285.

The Gaines oil field in northern Pennsylvania, M. L. Fuller. Twenty-second Annual Rept., Pt. III, 1902. pp. 54.

The Hyner gas pool, Clinton county, by M. L. Fuller. Bull. 225.

Oil and gas fields of eastern Greene county, Pennsylvania, R. W. Stone. Bull. 225.

The copper deposits of South Mountain, in Southern Pennsylvania, by G. W. Stose. Bull. No. 430.

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Technological.

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Survey Work on Coal during 1905, by M. R. Campbell. Bull. No. 285. Gives a short account of geologic work on coal areas in 1905, of the work of the fuel-testing division, and of the classification of coals.

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Hydrography of the Susquehanna River drainage basin, by J. C. Hoyt and R. H. Anderson, 1905. W. S. No. 109.

Papers on the Water Resources of Chambersburg, Mercersburg, Curwensville, Ebensburg, Barnesboro, Elders Ridge, Waynesburg, Accident and Grantsville quadrangles, by M. L. Fuller, Geologist in charge, 1904. W. S. No. 110.

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Underground waters of eastern United States, by M. L. Fuller. W. S. No. 114.

Papers on stream measurement have been published under different titles in Water-Supply and Irrigation Papers as follows: Nos. 47, 48 (1901), 82 (1903), 97 (1904), 125, 126, 128 (1905), 167, 169 (1906), 202, 203, 205 (1907), 206 (1907), 241 (1909), 243 (1910), 261, 263, 281, 283 (1911).

APPENDIX B.

List of Completed Topographic Maps.

APPENDIX B.

LIST OF COMPLETED TOPOGRAPHIC MAPS.

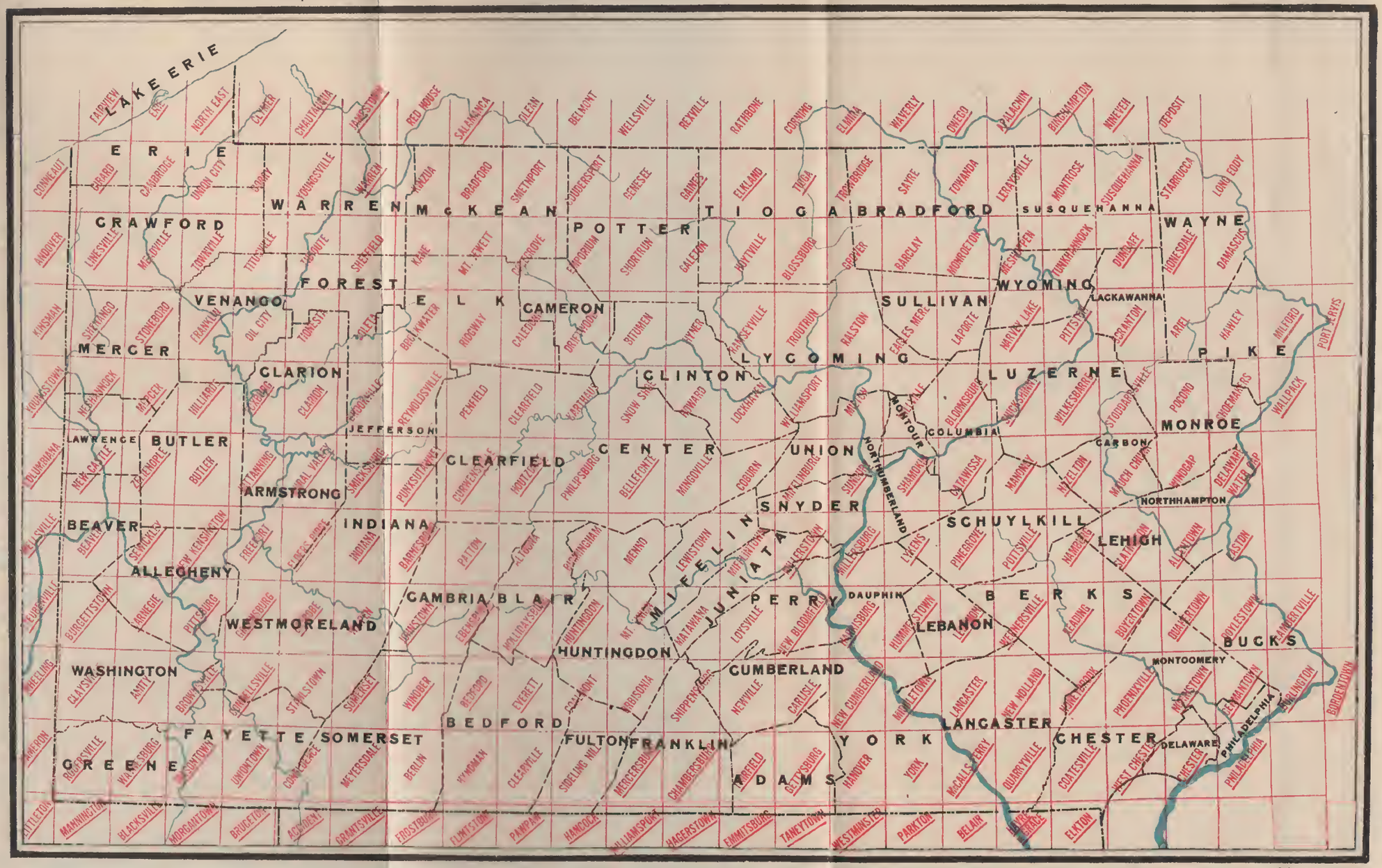
The annexed table represents the completed maps, which are published, and can be had from the United States Geological Survey. Others are in course of publication and will soon be issued.

Quadrangle.	Area mapped.
Accident (Md.-Pa.,-W. Va.),	25.86
Allentown,	226.73
Amity,	228.40
Andover (Pa.-Ohio),	17.60
Barnesboro,	226.73
Beaver,	226.73
Bedford,	228.40
Belair (Pa. Md.),	26.00
Bellefonte,	225.90
Blacksville (W. Va.-Pa.),	26.28
Bloomsburg,	225.06
Bordentown (N. J.-Pa),	2.82
Boyertown,	227.57
Brownsville,	228.40
Bruceton (W. Va.-Pa),	26.61
Burgettstown,	227.57
Burlington (Pa.-N. J.),	138.50
Butler,	225.90
Camden (N. J.-Pa.-Del), a	209.73
Cameron (W. Va.-Ohio-Pa.),	17.60
Carlisle,	228.40
Carnegie,	227.57
Catawissa,	225.90
Chambersburg,	229.22
Chester (Pa.-Del-N. J.),b	153.73
Clarion,	225.06

a. Chester and Philadelphia sheets, on scale of 1:62,500, have been reduced, and form parts of Camden sheet, on scale of 1:125,000.
b. Philadelphia and vicinity sheet includes Chester, Germantown, Norristown and Philadelphia sheets.

TOPOGRAPHIC AND GEOLOGIC SURVEY OF PENNSYLVANIA
GEORGE W. McNEES, ANDREW S. McCREATH, E. V. D'INVILLIERS, COMMISSIONERS.
RICHARD R. HICE, STATE GEOLOGIST

PLATE III



C.S.H.& CO. N.Y.

INDEX MAP OF TOPOGRAPHIC ATLAS SHEETS.

The names of sheets issued are underscored.

Quadrangle.	Area mapped.
Claysville,	228.40
Coatesville,	229.22
Columbiana (Pa.-Ohio),	17.60
Conneaut (Pa.-Ohio),	16.00
Connellsville,	228.40
Curwensville,	225.90
Delaware Water Gap (Pa.-N J.),	131.01
Doylestown (Pa.-N. J.),	207.10
Dundaff,	223.36
Easton (Pa.-N. J.),	80.18
Ebensburg,	227.57
Elders Ridge,	226.73
Elkland,	222.50
Elkton (Md.-Del.-Pa.),	28.50
Elmira (N. Y.-Pa.),	1.55
Emmitsburg (Md.-Pa.),	26.00
Erie,	114.61
Everett,	228.40
Fairfield,	229.22
Fairview,	22.92
Flintstone (Md.-Pa.-W. Va),	26.91
Foxburg,	225.06
Franklin,	224.21
Freeport,	226.73
Frostburg (Md.-W. Va.-Pa.),	26.37
Gaines,	222.50
Germantown (Pa.-N. J.), c	225.00
Gettysburg,	229.22
Girard,	219.50
Grantsville (Md.-Pa.),	25.86
Greensburg,	227.57
Hamburg,	226.73
Hancock (W. Va.-Md.-Pa.),	25.37
Harrisburg,	227.57
Harvey Lake,	224.21
Havre de Grace (Md.-Pa.),	25.36
Hazleton,	225.90
Hilliards,	225.06
Holidaysburg,	227.57
Honesdale,	226.36
Honeybrook (Suplee),	228.40

c. Philadelphia and vicinity sheet includes Chester, Germantown, Norristown and Philadelphia sheets.

Quadrangle.	Area mapped.
Houtzdale,	225.90
Hummelstown,	227.57
Huntingdon,	227.57
Indiana,	226.73
Johnstown,	227.57
Kinsman (Pa.-Ohio),	17.60
Kittanning,	225.90
Lambertville (Pa.-N. J.),	49.86
Lancaster,	228.40
Latrobe,	227.57
Lebanon,	227.57
Linesville,	223.36
Littleton (W. Va.-Pa.),	1.95
Lykens,	226.73
McCalls Ferry,	229.22
Mahanoy,	225.90
Mannington (W. Va.-Pa.),	26.28
Masontown,	229.22
Mercer,	225.06
Mercersburg,	229.22
Middletown,	228.40
Milford, (Pa.-N. Y.-N. J.),	162.00
Millersburg,	226.73
Millerstown,	226.73
Morgantown (W. Va.-Pa.),	26.90
New Bloomfield,	227.57
New Castle,	225.90
Neshannock,	225.06
New Cumberland,	228.40
New Holland,	228.40
New Kensington,	226.73
Norristown,d	228.40
Northeast,	186.65
Owego (N. Y.-Pa.),	1.29
Parkton (Md.-Pa.),	26.00
Patton,	226.73
Pawpaw (Md.-W. Va.-Pa.),	25.86
Philadelphia (Pa.-N. J.),e	56.00
Philadelphia and vicinity (Pa.-N. J.-Del),f	623.13
Phoenixville,	228.40
Pinegrove,	226.73

d. Philadelphia and vicinity sheet includes Chester, Germantown, Norristown and Philadelphia sheet.
e. Chester and Philadelphia sheets on scale of 1:62,500, have been reduced, and form parts of Camden sheet, on scale of 1:125,000.
f. Philadelphia and vicinity sheet includes Chester, Norristown and Philadelphia sheets.

Quadrangle.	Area mapped.
Pittsburg,	227.57
Pittston,	224.21
Port Jervis (N. J.-Pa.),	6.00
Pottsville,	226.73
Punxsutawney,	225.90
Quakertown,	227.57
Quarryville,	229.22
Reading,	227.57
Rogersville,	229.22
Rural Valley,	225.90
Scranton,	224.21
Sewickley,	226.73
Shamokin,	225.90
Shenango,	224.21
Shickshinny,	225.06
Slatington,	226.73
Smicksburg,	225.90
Somerset,	228.40
Steubenville (Ohio-W. Va.-Pa.),	17.60
Stoneboro,	224.21
Sunbury,	225.90
Taneytown (Md.-Pa),	26.00
Tioga,	225.50
Uniontown,	229.22
Wallpack (N. J.-Pa.),	52.50
Warren (Pa.-N. Y.),	219.00
Waynesburg,	229.22
Wellsville (Ohio-W. Va.-Pa.),	17.60
Wernersville,	227.57
West Chester (Pa.-Del.),	165.55
Westminster (Md.-Pa.),	26.00
Wheeling (W. Va.-Ohio-Pa.),	17.60
Wilkes-Barre,	225.06
Williamsport (Pa.-Md.-W. Va.)	25.00
York,	229.22
York special,	75.33
Youngstown (Ohio-Pa.),	17.60
Zelienople,	225.90
Total Area (144 quadrangle) mapped	24,375.57

APPENDIX C.

Present Status of the Copper Developments in the South Mountain Region

By G. M. BEVIER.

APPENDIX C.

THE PRESENT STATUS OF THE COPPER DEVELOPMENT IN THE SOUTH MOUNTAIN REGION.

By G. M. BEVIER.

INTRODUCTION.

While there have been a number of reports covering the copper ore area of the South Mountain region, yet the continued expenditure of effort and money in the attempt to secure workable deposits rendered it desirable that a re-examination be made of the present condition of the prospects, and that a statement of the facts as they exist at the present time be placed on record where available to the people of the State. This report is, therefore, a brief statement of the present condition of the operations, with a summary of the history, development and future possibilities of the South Mountain region as a copper producer.

Prospecting for copper in southeastern Pennsylvania has been carried on for many years with little or no success. The only territory now being worked is a small area in the southwestern portion of Adams County, and an adjoining narrow strip of southeastern Franklin County. Here are found some interesting deposits of copper ore in the pre-Cambrian eruptives of the South Mountain chain, which lie in a belt 1½ miles wide, and extend from the Maryland state line in a northeasterly direction for a distance of about 8 miles. It has for its western boundary a massive bed of Cambrian quartzite-conglomerate and sericite-schist. On the east it is cut off by the Cambrian quartzite of Jacks Mountain, and farther north by beds of acid volcanic rocks. Beyond this point the basic rocks extend in a narrow line some 5 miles farther north, where they are cut off by a fault running in a southwesterly direction from a point 1 mile north of Cashtown.

The ore found is generally associated with the basic lavas, known locally as "greenstone," and occurs at or near the contact with the acid volcanic rocks. The ore consists in most cases of native copper in minute specks or flakes distributed throughout the rocks, and the whole is more or less colored by the blue and green carbonates of copper-azurite and malachite.

The South Mountain belt lies in that chain of the Appalachians extending from the Green Mountains in Vermont to the Carolinas. At the Maryland state line they bend north and east in a wide open curve toward the Susquehanna River. The South Mountain portion is about 50 miles in length and 10 miles wide, with elevations rarely exceeding 2,100 feet.

The first important publication on the South Mountain area appeared in 1858 in the final report of the First Geological Survey of Pennsylvania, by Henry D. Rogers. The next important publications occurred in the reports of the Second Geological Survey of Pennsylvania; the work in this region being done by Dr. Persifor Frazer, Jr., under the general direction of the State Geologist, J. P. Lesley.

Since the publication of the reports mentioned there have been a number of reports treating on this area in more or less detail. A list of the more important will be found at the close of this paper. These published reports have been freely used in the preparation of the present paper. Without their aid it would have been impossible to examine this field with the resources of the present survey.

HISTORY.

Mention of these ores was made as early as 1787, when an article appeared in a German publication, *a* stating that the "South Mountain in its entire extent contains rich crevices, gangues and nests of ore, especially of iron and copper."

E. T. Wherry gives a very interesting account of the early attempts made by Colonists in search for copper in Pennsylvania. He states that a mine was worked in Bucks County in the year 1650, and a quantity of ore was shipped to England for treatment. However, the first copper producer of record in Pennsylvania was the Gap Mine, in Lancaster County, which was opened late in the 18th century, and as a copper mine was a failure, but was re-opened as a nickel mine in 1850 and was the only successful producer of that metal in North America until it was closed by competition in 1893.

The first serious attempt to mine copper ore in Adams County was about the year 1836, *b* when a small reveberatory furnace was erected at the Copper Furnace mine on the Bingham property. According to reports this furnace was operated for 6 or 8 months and a small quantity of copper was smelted, but the location was later abandoned, and no remains of this smelter are to be found at the present time. The old shafts have long since fallen in or been filled.

According to B. S. Lyman there are about 30 localities in Bucks and Montgomery counties where traces of copper ore have been found in the Perkasie shales. The ore occurs as slight stains of malachite and azurite, with a small amount of minute specks of

a Schöpf. Beyträge, zur mineralogischen kentniss des ostlichen Theils von Nordamerika und seiner Gebürge, chap. 30. pp 66-101.
b Frazer, Jr., Second Geological Survey of Pennsylvania: Vol. C. C. C., p. 307.

MAP SHOWING LOCATION OF COPPER PROSPECTS SOUTH MOUNTAIN REGION

1 – UNITED MILLING & SMELTING COPPER CO.
2 – HEADLIGHT MINE
3 – VIRGIN COPPER MINE
4 – BINGHAM MINE
5 – REED HILL MINE
6 – OLD FURNACE MINES
7 – RUSSEL MINE
8 – BECHTEL SHAFT
9 – JACKS MT. SHAFTS
10 – SNIVELY MINE

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copper pyrites. These deposits have been prospected for more than a century, but are not workable commercially. Mention should also be made of similar deposits of copper in the counties of Berks, Chester, Columbia, Lancaster, Lebanon, Montgomery and Philadelphia. According to Stevens (Copper Hand Book Vol. X, 1910-11) the old mines at Cornwall, Lebanon County, show native copper, cuprite, azurite, malachite, chalcopyrite, chrysocolla, and bochantite. In Montgomery County the Perkiomen mine shows fully as long a list of copper minerals. Oxide, carbonate, sulphid and silicate ores of copper have been found at the Franklin quarry in the City of Philadelphia. The only copper now produced in Pennsylvania is from the Cornwall iron ore mines, where it is separated from the magnetite ores.

DESCRIPTION OF PROPERTIES.

United Milling and Smelting Copper Company. This mine is located on Minie Branch Creek, ½ mile south of Gladhill Station, just below the Waynesboro Turnpike. It was formerly known as the Eagle Metallic Copper Company Mine. At the time of the writer's visit the workings were filled with water to the surface, and the mine had been idle for 2 years, but active operations were started in November, 1913, and an effort was being made to dewater the mine and overhaul the equipment.

The mine workings are reported to consist of a 50 feet square open cut, connected with a 6 by 8 foot slope, extending 450 feet in a southeasterly direction, and pitching 47° with the plane of contact. This slope enters at the "Contact of copper stained, massive epidosite, with overlying, highly altered, and weathered chlorite-schist" (Stose). Development work has been carried on by following the plane of contact and cross cutting at various points along the slope. The intention is to extend the development work on the lower levels where greenstone is reported to be impregnated with fine specks, stringers and sheets of native copper.

This property has some excellent equipment, which is located on the hill a short distance above. This consists of two 125 H. P. boilers, three steam engines, electric lighting and power plant, Ingersoll air compressor, two stone crushers, one 150 ton copper blast furnace, one 150 foot dust chamber, assay laboratory, and other accessories.

The ore is conveyed from the mine to the smelter by two heavy aerial wire cables. An examination of the dump showed copper stained greenstones, containing a small quantity of copper carbonates, vein quartz with specular hematite, serpentine and epidote. Selected samples from the assay laboratory contained but small amounts of copper. A chemical anaylsis of ore from the lower levels is reported to have shown small amounts of gold and silver.

The smelter was run for a short time, and a quantity of raw matter containing much iron and a low percentage of copper was found on the ground. It is reported that copper from the old Dominion Mine at Frederick, Md., is to be shipped and smelted here.

Through the courtesy of Mr. E. W. Mickley, Superintendent, the property was inspected and data obtained.

Virgin Copper Company. The Virgin Mine is situated on the crest of a small hill, 1 mile west of Pine Mountain, 1 mile north of Charmian, and on the Old Furnace road.

At the time of the writer's visit the mine was filled with water to within 75 feet of the surface, and had been idle for 2 years. Through the courtesy of Mr. C. E. Wills, Secretary, the property was examined, and the following data obtained.

A 6 by 8 foot slope, dipping southeast at an angle of 47½° was started in a small area of greenstone rock near the crest of the hill, and follows the dip of this rock for 310 feet. At a depth of 150 feet a 20 foot cross-cut is reported to have exposed rich deposits of copper in a sheeted zone of chlorite-schist, which is thickly impregnated for about 2 feet. Other cross cut work was done at depths of 200, 250 and 310 feet. Two bore holes, 308 and 600 feet deep respectively, were put down east of the slope and are reported to have passed through a sheeted zone thickly impregnated with native copper.

A small area in the immediate vicinity of the mine entrance is sheeted and sheared and is cut by numerous thin veins of quartz and epidosite. "About 80 feet below the mine on the west side of the hill occurs massive porphyry, and near the contact fragments of coarse amygdaloidal greenstone and breccia were found." (Stose.)

The dump shows greenstone traversed by thin veins of quartz, epidosite and asbestos, containing specks and stringers of native copper. The whole is more or less stained by carbonates of copper. Some very good ore was found, and picked samples of vein quartz contained a good percentage of native copper.

The equipment is in a good state of preservation, and consists of two steam engines, 125 H. P. boiler, air compressor, air tanks, air drills, head frame, skip car, steam pump, etc. Timbering and the mine are in good condition.

Russel Mine. This property is located a short distance above the forks of Copper Run, and 1 mile south of Mount Hope.

Considerable development work has been done at this mine, which is one of the older workings in the district. It has been operated intermittently for the past 60 years, and at one time was worked by the Reed Hill Copper Co.

At the time of the writer's visit the workings were filled with water, and had not been operated for 2 years. They are reported to consist of a 6 by 12 foot double compartment shaft 300 feet deep, connecting with an older slope 70 feet west of the shaft. At the

bottom of the shaft is 150 feet of cross-cut work, where sheet and lump copper is reported to have been found in epidosite and quartz veins. The shaft was sunk in the greenstone belt a short distance west of the contact with the acid volcanic rocks. Rocks in the vicinity of the shaft dip south, southeast, at an angle of 48°.

The dump shows amygdaloidal epidosite, stained by copper carbonates, and impregnated with fine specks of native copper. Some very rich samples of this ore were found. Other samples show chlorite-schist cut by thin veins of quartz, containing native copper, some epidote and calcite, all more or less stained by carbonates and oxides of copper.

The equipment consists of three small frame buildings, containing an 125 H. P. boiler, steam engine, pump, air compressor, air tank, drum hoist, air drills, etc. The shaft is well timbered and in a good state of preservation, and is equipped with a double bucket hoist.

There are several other old openings on this property where shallow pits and open cuts have been started, but were abandoned years ago, and are now inaccessible.

Bingham Mine. The Bingham, or Copper Furnace Mine, is located on the side hill, 1 mile northeast of Pine Mountain, and just below the Gladhill Road. About the year 1840 this mine was operated by a Philadelphia Company, which erected a small reverberatory furnace, and an attempt was made to smelt the ore on the property. The furnace was operated for about 6 months, but was later abandoned, and all traces of this plant have long since disappeared. T. J. Bailey reported, in 1883, a 40 foot shaft in quartzite. He stated that the ore appeared to lie in thin distinct veins upon the hill, and that 4 or 5 tons of float ore had been shipped to a smelter for treatment. It was later prospected by the National Copper Co.

The workings consist of a 40 by 40 foot open cut, which has recently caved, and the bottom is covered. No buildings or equipment were found, and the mine has not been worked for several years.

The open cut was started on the contact of the acid and basic volcanic rocks, which at this place are easily distinguished, and dip southeast at an angle of about 45°. The face of the open cut shows a much altered district, cut by numerous small faults. Thin veins of quartz and epidosite are in evidence, and are more or less stained by copper oxides and carbonates. "The joint planes are brilliantly stained blue and green by copper carbonates, appealing to the prospector as representing large quantities of copper. The country rock is a beautiful, fine, even grained rhyolite, mostly drab with pink splotches, in part stained with dark epidote filled amygdules. The body of the rock is in places largely altered to epidote and quartz derived from the adjacent greenstone. An eastward

dipping crushed zone composed partly of red clay, is exposed in the cut, and it is probable that the concentration of ore is associated with this channel of circulating waters." (Stose.)

The dump presents some very showy ore, beautifully stained by the oxides and carbonates, which in reality contain but very little copper. Quartz and quartz porphyry were in evidence with some asbestos and rhyolite.

The region in the immediate vicinity of the mine is greatly sheeted and sheared and circulating underground waters have had much to do with the concentration of the ore and the present metamorphic condition of the rocks.

An analysis of these ores, according to Bascom, showed 4 per cent. of copper. Metallic copper is reported to occur in quartz veins traversing the amygdaloids, and in submacroscopic quantities in the amygdules. In this latter case the copper is frequently surrounded by zones of the oxide and the carbonate.

Headlight Mine. This mine is located ½ mile east of Charmian, just below the Waynesboro Turnpike. It was filled with water, and inaccessible at the time of the writer's visit, but the workings are reported to consist of a 6 by 8 foot stone walled tunnel 160 feet long. "Bailey reported in 1883 that at a distance of 60 feet from the mouth of the tunnel, an oblique impregnated chute was encountered, exposing an area of 24 square feet of ore bearing rock, in which the copper was uniformly disseminated for a width of 5 feet running from 10 to 20 per cent. copper." (Stose.)

An attempt was made at one time to smelt this ore on the property, and a small furnace was erected for that purpose. It was shortly afterwards abandoned and all work suspended.

The tunnel is in the greenstone belt, and the rocks in the vicinity dip southeast at an angle of 30°. At the mouth of the tunnel was found a fault on the line of dip, having an east and west trend.

The dump shows greenstone more or less stained by copper carbonates but containing a very low percentage of copper. Quartz, epidote and some asbestos were also observed.

Reed Hill Mine. This prospect is located on the north side of Toms Creek, ½ mile west of the junction of Toms Creek and Copper Run.

This mine marks the location of one of the earlier attempts at copper mining in this district, and has been operated intermittently for more than 75 years. According to Persifor Frazer, Jr., this mine was prospected by a Pittsburg Company about the year 1837. It was later operated by the Reed Hill Copper Co. without success. The workings consist of a narrow open cut 120 feet long which joins two short tunnels 30 and 50 feet long respectively. These workings have not been operated for four years, but are open and in good

condition. Other shallow shafts nearby have been worked but have long since been filled.

The property is located in the centre of the greenstone belt "Which is here in part dense, massive, and crystalline, in part scoriaceous and altered to epidote, quartz and chlorite." (Stose.)

Native copper and carbonate stains are found in thin veins of quartz and epidosite, and also along the planes of fracture. The rocks at this point dip southeast, at an angle of about 55°, and are greatly sheeted and sheared. Slickenslides are common and show evidence of reddish brown iron stains, with a little magnetite.

The dump shows vein quartz and epidosite containing fine specks of native copper, and more or less stained by copper carbonates. Some iron stains and a little magnetite were noticed.

The equipment consists of a small building, containing an engine, boiler, air compressor, air tank, pump, etc., in a fair state of preservation.

Snively Mine. This mine is located $\frac{1}{4}$ mile northeast of Mount Hope, near the top of Musslemans Hill. At the time of the writer's visit the workings were inaccessible and had been idle for several years. They are reported by Henderson to occur in an 8 foot layer of epidosite lying between walls of chlorite-schist that dip 52° southeast. Selected samples of this ore analyzed by Henderson showed 5.83 per cent. copper; but a careful sample taken from the run-of-mine gave only 1.82 per cent. copper. "Some of the finest specimens of copper have been found as float on this property." (Stose.)

"The mine is located near the contact with the rhyolite to the east, which is here a sericite-schist. The schist has also been prospected near the stream level by a large tunnel." (Stose.)

The dump showed amygdaloidal greenstone altered to epidosite and impregnated with native copper. Carbonate and oxide stains are also observed.

Jacks Mountain Shafts. Several old shafts were found along the Hagerstown road on the east slope of Jacks Mountain. These workings have been abandoned for many years, and are not accessible.

The dumps show amygdaloidal greenstone, slightly colored by copper carbonates and iron stains along the fracture planes.

GEOLOGY.

According to Bascom three distinct rock types are to be recognized. (1) A silicious sedimentary rock, represented by a quartzose conglomerate, a sandstone and a quartzite. This is rarely accompanied by an interbedded argillaceous slate. (2) An acid volcanic rock, which shows all phases of crystallization from a spherulitic rhyolite to a true quartz porphyry, is amygdaloidal or compact, is

accompanied by pyroclastics, breccias and is sometimes sheared into a perfectly fissile slate or sericite-schist. (3) A basic holocrystalline, volcanic rock, which is amygdaloidal, massive, and more frequently schistose, and is also accompanied by pyroclastics and breccias and sheared to a slate.

The slates of the region, therefore, belong to both the sedimentary and igneous formation. The former are argillaceous. The latter are either acid or basic, and are far more abundant.

Sedimentary Rocks. The sedimentary rocks occupy the higher ridges, and form a conspicuous capping along Pine Mountain, Green Ridge, Jacks Mountain, etc. They have a northeast-southwest strike, with a mean dip of about 45° southeast. Estimates of the thickness of these sediments vary greatly. Rogers considers the thickness to be 1,000 feet. Lesley, on the other hand, considers them immensely thick, and states that Frazer's section showed 32,000 feet of quartzite and 64,000 feet of schistose conglomerate. Bascom considers Rogers estimate the more probable. These rocks are the Primal white sandstones of Prof. Roger's report.

Sedimentary formations show two marked phases, the conglomerate and the quartzose, the lower member being the conglomeratic. These conglomerates are frequently slaty through the development of more or less sericite. They contain pebbles of quartz, porphyry and dark green slate. The sediments pass from a coarse sandstone into a compact quartzite, showing, according to Bascom, the characteristics of a recrystallized clastic. The sandstone has been greatly fissured and broken by the intrusion of conspicuous quartz veins.

In a cut on the Gettysburg railroad, southwest of old Maria Furnace, the red rock is locally of a different character. Shearing has been accompanied by the development of sericite and chlorite, producing a soft, green, slaty rock. Zircon is present. The major portion of the rock consists of quartz grains with undulating extinction. On the hill-tops, southeast of Jacks Mountain, it appears as a yellow schistose rock. An argillaceous slate is sometimes found associated with the sandstone. North of Jacks Mountain station some interbedded slate may be found. It is silky, pearl gray, crinkled, and cleaves readily.

Through the discoveries of Dr. Walcott the sedimentary deposits have been found to belong to Lower Cambrian time. The relative position of the three rock types is clear. The sandstone lies wholly above the eruptives, and is younger. The flanks of the Mountains and the valleys are all formed of volcanic material, which offers less resistance to erosion than the hard sandstone.

Acid Eruptives. The acid lavas are much less abundant than the basic ones, and tend to occupy the lower altitudes in this area. They are always readily distinguished from the basic rocks by their bright colors, which range from a brick red, through pink, purple,

blue and green to gray. Opaque white or red phenochrysts may be conspicuous or almost absent. Beds of spherulites, simulating bedding planes, are a prominent feature. The amygdaloidal character is less general than with the basic rocks, although it may be very pronounced. Both flow and tuff breccias occur. The rocks split readily into slabs, and in general are cleaved parallel to the structure planes of the sedimentary rocks. In some instances the porphyries have been sheared into slates, still preserving the crystalline outlines of the feldspar phenochrysts, or into fissile sericite-schists.

The minerals of the porphyry have not been altered as extensively as those of the greenstone, and as a result chlorite and epidote are not common constituents of the rock.

These porphyries are durable, rich in color, and susceptible of a good polish, but have not yet been quarried for construction purposes.

Basic Eruptives. The basic eruptives occupy an area fully twice as large as that covered by the acid eruptives, constituting the greater part of the valleys, foothills, and mountain flanks. To the east this greenstone area ends abruptly where the mountains give place to the Triassic plain. On the north the greenstone is partly concealed by overlying Cambrian sediments, and beyond it is cut off by a diagonal fault. They are massive schistose or slaty, and are usually amygdaloidal. Associated with these amygdaloids are banded fine grained schists, which have been considered altered accumulations of volcanic ash. The basic rocks, by reason of their softer character, are more subject to alteration under dynamic action than are the acid eruptives. The effect of this is seen in the almost universal schistosity of the basic rocks. The metamorphism is accompanied by a correspondingly greater chemical alteration than is shown by the acid rocks. The alteration consists largely in the abundant development of epidote and chlorite, which is the cementing material, and gives the rock its uniformly green color, and popular name of "greenstone."

ORIGIN OF THE ORE.

Although it has not been proven that the lava was originally copper bearing yet it is generally believed that minute particles of the metal, probably as sulphid, were disseminated through the basic flows as original constituents.

In pre-Cambrian time, and again late in the Carboniferous, the rocks were subject to great compression and heat, and in the presence of heated waters the original minerals were altered. The replacement of feldspar by chlorite and epidote, and their replacement in turn by copper, characterizes the amygdules of the South Mountain. Much of the lavas is vesicular and porous, and furnished a passageway for circulating waters.

They were also sheeted and sheared during the great dynamic action, and circulating waters followed these sheeted zones. Alteration was most active along these planes of contact.

The transportation and concentration of the ore must have been effected by solution. The copper mineral, probably sulphid, was dissolved as sulphate, and possibly changed to carbonate or silicate. The solutions, either oversaturated with dissolved minerals, lowered in temperature, or were acted on by some precipitating agent, depositing the minerals on the walls, cavities and crevices of the rocks. It is probable that the copper was deposited from solution in the native state, like the rich deposits in the Lake Superior region, where native copper continues to great depth.

There is a great petrographical similarity between the porphyrites, felsites and diabase porphyrites of the Keweenawan series, and their equivalents in the South Mountain region.

COMPARATIVE AGE OF ROCKS.

That the Cambrian rocks do not underlie the slates and orthofelsites as stated in the earlier Pennsylvania reports is evident. Contacts between the sedimentary and igneous rocks are finely exposed at a few places. About half way through the tunnel on the Gettysburg Railroad the basic igneous rocks and the Cambrian rocks are in contact. Both formations dip 20° southeast. Close to the greenstone the sedimentary deposits have acquired a green color due to the abundant development of chlorite. It has become very schistose, and might readily become confused with the greenstone itself. These contacts indicate the younger age of the overlying sediments.

The relative age of the acid and basic volcanics is a question to which it is not possible, with out present knowledge, to give an entirely satisfactory answer.

The acid rocks, as a rule, occupy the lower altitudes, and are sometimes overlain by the basic eruptives. Keith states that the quartz porphyries underlie the diabase. It is probable that there were several sources of this lava flow through the South Mountain. The southern vents furnished great masses of basic lavas while farther north we find enormous quantities of acid eruptives. In the Monterey district the two lavas are mingled and apparently the basic flow was preceded by the acid flow.

These rocks are surface flows, and lithographically resemble the Keweenawan copper bearing series of Lake Superior.

With the absence of any genuine dykes of either acid or basic character, the data for determination of the comparative age of these rocks is not sufficient; however, field observations in the Monterey district indicate that the acid rocks are the older.

The intense dynamic action shown by the igneons rocks occurred after the deposition of the sediments. Since the sediments were laid down the whole region has been subjected to intense lateral pressure, (at the time of the Appalachian uplift), whereby the igneous rocks were cleaved and sheared and the sedimentary formation was thrust up over them from the east. With the lateral pressure the whole region was elevated and a great thickness of material has since been eroded.

These South Mountain deposits have been the subject of much discussion, and, as before noted, an attempt was made at one time to correlate them with deposits found in the Lake Superior region. This attempt was based upon the mineralogical resemblances to certain greenstones and epidotic rocks there associated with the copper and copper ores. In 1872, however, Dr. T. Sterry Hunt found clear evidence of a stratigraphical break between the Keweenawan series of the Lake Superior district, and the Huronian rocks of the South Mountain area.

THE FUTURE PROSPECTS OF THE REGION.

The attempts which have been made in the past 75 years to develop a workable deposit of copper in this district are indicated by the descriptions of the several properties heretofore given, but these properties do not, by any means, show all the attempts at development. Large sums of money have been wasted, as is evidenced by the remains of possibly 200 points at which shafts, open cuts, tunnels, etc., have been excavated in an endeavor to utilize the apparent underground wealth.

Up to the present writing there has not been one instance of a mine producing copper ore in even apparent paying quantities. A few of the mines have reached a depth of from 300 to 450 feet, and have been prospected on the lower levels without success. It must be said, however, that most of the openings are comparatively shallow, and it is probably true, with few exceptions, that poor management and unsystematic methods, combined with unskilled labor, has greatly retarded the progress and added to the cost of development work. The investor has been encouraged by the occasional nuggets of metallic copper, weighing several pounds or more, which have been picked up in the surrounding country, and the very showy samples of ore, often containing 20 per cent. or more of native copper. However, such ore has only been found in occasional thin veins and chutes of quartz and epidotic rocks, which require the removal of large quantities of barren material for the small amount of copper recovered.

It is the hope of those interested that with greater depth, thicker and richer copper bearing veins will be encountered, but the ex-

perience with ores of this class elsewhere leaves but little to expect in this direction; and it cannot be said that the developments of the past in this region point to any such increase in the value of the ores. While there is a possibility that thicker veins may be found with depth, yet the almost total absence of sulphid ores does not encourage this belief.

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APPENDIX D.

Check Triangulation Net in Carnegie Quadrangle,
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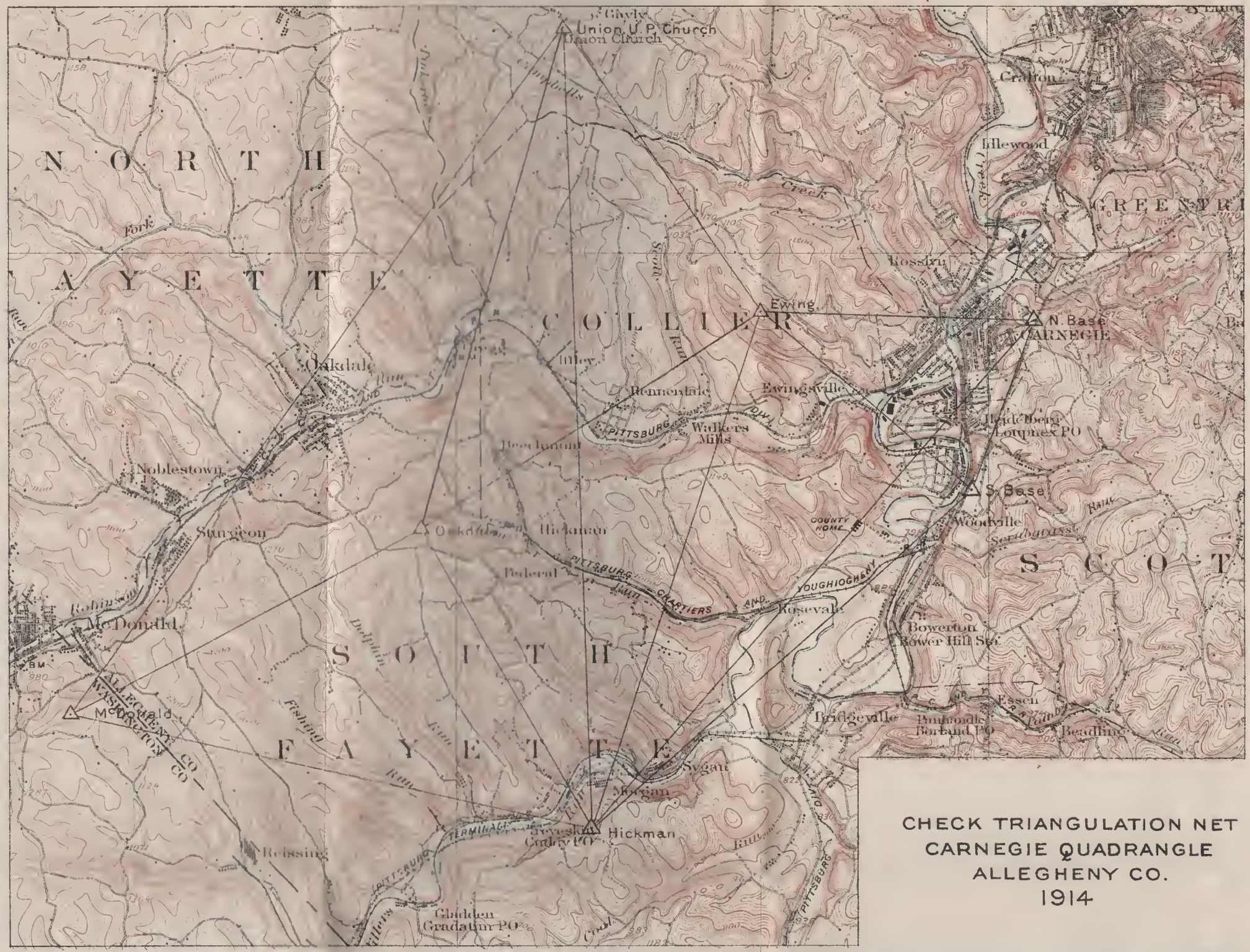

CHECK TRIANGULATION NET
CARNEGIE QUADRANGLE
ALLEGHENY CO.
1914

APPENDIX D.

TRIANGULATION STATIONS.

CARNEGIE QUADRANGLE.

ALLEGHENY COUNTY.

For the purpose of testing the accuracy of distances between triangulation stations in Southwestern Pennsylvania established in 1899 and 1900, a check base was measured in the spring of 1914 near Carnegie and expanded to stations Hickman, McDonald, and Union Church. All of the observations were made independently by two observers, S. S. Gannett and Geo. T. Hawkins. The base, 7,000 feet in length, was measured twice along a tangent of the Wabash Railroad, southeast of Carnegie, using U. S. Geological Surveying tape 3 T. The two measurements, uncorrected for temperature, differed by .02 foot, and allowing for difference of temperature the discrepancy was .001 foot. Angles at all stations were measured at least 10 times by Mr. Hawkins using 8-inch Theodolite No. 424, reading by micrometers to 2 seconds of arc, and were also measured independently 10 times or more by Mr. Gannett using 8-inch micrometer theodolite 435. In making the final computation all of these angles were combined and a least square figure adjustment made; 7 stations in the scheme forming two figures.

The tape as compared at the Bureau of Standards, Washington, D. C., April 20, 1914, was found to be 299.98 feet in length. After the work was completed it was tested again on May 20, 1914, by the Bureau of Standards and found to be 299.9796 feet in length; that is, practically no change had been made in the length of the tape by use in measurement.

Each end of the base is in a deep cut and in order to expand to the triangulation stations it was necessary to transfer the north end to the embankment 65 feet west of the track and to transfer the south end to the embankment 32 feet east of the track. An iron post 3½ inches in diameter and 4 feet in length was set as a permanent mark on the bank at each end as thus transferred and a tripod signal erected over center of each post.

The distance measured along the track was then computed using value of tape 299.98 feet as follows:

23⅓ tapes x 299.98 feet, ...	6,999.530 feet.
Reduction to horizontal, ...	—.120
Reduction to sea level, ...	—.300
Correction for temperature, reduction to 62° F., ...	+.053
Length of base on track reduced to sea level, ...	6,999.163 feet.

The distance from signal to signal was then computed allowing for the offset at each end of base, the result obtained being 6,999.824 feet, log. meters=3.3291030.

Using the latter value in log. meters, distances were computed from the base through 10 triangles to lines of the old triangulation Hickman-McDonald, Hickman-U. P. Church and McDonald-U. P. Church, the new values for these distances being shorter than the old ones by one part in 16,000 or less than 4 inches in a mile thus proving the error in the old work smaller than one would expect in triangulation extended simply for topographic control and not for geodetic purposes.

In 1900 a check on distances derived from the Hillside base was made on the line St. Clair-Morley, near the Pennsylvania-West Virginia state line; the value from Hillside base being long by one foot in 9222. In 1901 another check on distance was made in the line Palmer-McCoy in Indiana County, the value from Hillside base being long by one foot in 9600. In Allegheny County the distances which have been used are therefore much nearer correct than those between stations further removed from the Hillside base.

CARNEGIE, NORTH BASE, ALLEGHENY COUNTY, PA.

Situated 0.1 mile north of Wabash-Pittsburg Terminal Station at Carnegie, on bank of cut west of railroad, 65.5 feet west of west rail.

Signal: A Lumber tripod over center.

Station mark: An iron bench mark post set 3½ feet in ground.

Reference mark: 1. 14.15 feet west to curb inside line on east side of paved street.

2. Southeast corner of two-story house 139.8 feet, true azimuth 178° 59′.

3. South end of straight curb line 137 feet on west side of paved street, true azimuth 38° 26′.

LATITUDE 40° 24′ 21.58″. LONGITUDE 80° 04′ 39.46″.

To Station.	Azimuth.			Back Azimuth.			Distance.	
	°	′	″	°	′	″	Log. Mets.	Feet.
South base,	21	20	35.37	201	20	14.03	3.3291030	6,999.82
Hickman,	41	54	42.46	221	52	03.48	3.9380110	28,444.30
Ewing,	96	17	25.65	276	15	48.83	3.5493665	11,623.87

CARNEGIE, SOUTH BASE, ALLEGHENY COUNTY, PA.

Situated 1.3 miles south of Carnegie Railroad Station, Wabash-Pittsburg Terminal, 31 feet east of track, 5 feet east of edge of steep bank of Railroad cut and about 100 feet south of the south end of tangent.

Signal: A tripod over center.

Station mark: An iron bench mark post set in ground, top projects 6 inches above surface.

Reference marks: (1) Center of oil well, 121.5 feet distant, true azimuth 8° 46′.

(2) Nail in blaze in maple tree, 102.5 feet distant, azimuth 250° 43′.

LATITUDE 40° 23′ 17.15″. LONGITUDE 80° 05′ 12.40″.

To Station.	Azimuth.			Back Azimuth.			Distance.	
	°	′	″	°	′	″	Log. Mets.	Feet.
[illegible]man,	48	18	56.58	228	16	38.91	3.8269992	22,028.42
[illegible]ing,	130	51	52.40	310	50	36.94	3.5599303	11,910.07
[illegible]th base,	201	20	14.03	21	20	35.37	3.3291630	6,999.82

EWING, ALLEGHENY COUNTY, PA.

A station in the base expansion. On a cleared ridge 2 miles west of Carnegie on land owned by Mr. Ewing, 400 yards southwest of his house, occupied by a renter.

Signal: A lumber tripod over center.

Station mark: An iron bench mark post set 3 feet in ground.

Reference marks: (1) Nail in dead cedar tree on southwest side of hill, 45.0 feet distant, true azimuth 41° 13′.

(2) Nail in cherry tree on northeast side of hill 163.3 feet distant, true azimuth 129° 59′.

LATITUDE 40° 24′ 34.14″. LONGITUDE 80° 07′ 08.84″.

To Station.	Azimuth.			Back Azimuth.			Distance.	
	°	′	″	°	′	″	Log. Mets.	Feet.
Hickman,	18	19	48.79	198	18	46.57	3.8577430	23,644.34
Oakdale,	56	61	33.76	236	49	30.47	3.7291087	17,583.00
Union Church,	145	28	25.97	325	27	14.09	3.6636188	15,121.78
North base,	276	15	48.83	96	17	25.65	3.5493665	11,623.87
South base,	310	50	36.94	130	51	52.40	3.5599703	11,910.07

OAKDALE, ALLEGHENY COUNTY, PA.

In a cultivated field on a cleared ridge 1.5 miles south of Oakdale, and 0.25 mile southeast of house of Mr. Watters. The land is owned by the Boys Industrial Home.

Signal: A quadripod of sawed lumber over center of mark.

Station mark: An iron bench mark post set 3.2 feet in ground.

Reference mark: Nail in tree 63.9 feet distant true azimuth 217° 37′. Wire fence is 7.2 feet northwest.

LATITUDE 40° 22′ 59.11″. LONGITUDE 80° 10′ 19.08″.

To Station.	Azimuth.			Back Azimuth.			Distance.	
	°	′	″	°	′	″	Log. Mets.	Feet.
McDonald,	62	59	10.54	242	57	01.99	3.7206852	17,245.25
Union Church,	195	32	27.66	15	33	19.14	3.8440840	22,912.26
Ewing,	236	49	30.47	56	51	33.76	3.7291087	17,583.00
Hickman,	330	22	30.99	150	23	32.00	3.6530044	14,756.67

HICKMAN, ALLEGHENY COUNTY, PA.

On a bald hill in South Fayette Township, 2½ miles southwest of Bridgeville, on land belonging to William Hickman, who lives on south side of hill.

Station mark: A sandstone post 30 by 12 by 12 inches, set 28 inches in the ground, in the center of top of which is cemented a bronze tablet marked "U. S. Geological Survey—Pennsylvania."

LATITUDE 40° 20′ 52.33″. LONGITUDE 80° 08′ 44.87″.

To Station.	Azimuth.			Back Azimuth.			Distance.	
	°	′	″	°	′	″	Log. Mets.	Feet.
Oakdale,	150	23	32.00	330	22	30.99	3.6530044	14,756.67
Ewing,	198	18	46.57	18	19	48.79	3.8577430	23,644.33
North base,	221	52	03.48	41	54	42.46	3.9380110	28,444.30
South base,	228	16	38.91	48	18	56.53	3.8269992	22,028.42
Canonsburg,*	14	35	39.2	194	34	17.5	4.0737263	.....
McDonald,*	102	26	54.8	282	23	45.3	3.8495728	23,203.69
		†			†		3.8495456	23,202.24
Union U. P. Church,*	178	07	14.0	358	07	04.4	4.0271348	34,923.60
		†			†		4.0271076	34,921.41
Shannon,*	262	57	02.4	85	01	46.0	4.0175377	.....

*From Hillside base.
†From Carnegie base.

McDONALD, WASHINGTON COUNTY, PA.

In a pasture at the highest part of a hill, ½ mile south of McDonald, on land owned by Mr. William F. Wood, who lives on the southeast side of hill.

Station mark: A sandstone post 31 by 7 by 7 inches, set 55 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet marked "U. S. Geological Survey—Pennsylvania."

Reference marks: A large black oak line tree at the north boundary fence, 275 feet distant. A large white oak line tree at the west boundary fence, 303 feet distant.

LATITUDE 40° 21′ 41.66″. LONGITUDE, 80° 13′ 37.56″.

To Station.	Azimuth.			Back Azimuth.			Distance.	
	°	′	″	°	′	″	Log. Mets.	Feet.
Oakdale,	242	57	01.99	62	59	10.54	3.7206852	17,245.25
Union U. P. Church,*	215	40	45.6	35	43	45.7	4.0503035	36,837.31
		†			†		4.0502763	36,835.00
Hickman,*	282	23	45.3	102	26	54.8	3.8495728	23,203.69
Garrett,*	27	46	53.9	207	43	09.8	4.2450948	.....
Dickson,*	162	21	09.3	342	18	57.4	4.1985263	.....
Shannon,*	270	46	02.6	90	53	55.8	4.2365717	.....
Canonsburg,	313	09	24.7	161	11	12.3	4.1326119	.....

*From Hillside base.
†From Carnegie base.

UNION U. P. CHURCH, ALLEGHENY COUNTY, PA.

A brick church with a square tower on its northeast corner, situated on a hill 1 mile west of Remington, on the Steubenville pike.

Station mark: Center of tower.

LATITUDE 40° 26′ 37.25″. LONGITUDE 80° 08′ 59.69″.

To Station.	Azimuth.			Back Azimuth.			Distance.	
	°	′	″	°	′	″	Log. Mets.	Feet.
Oakdale,	15	33	19.14	195	32	27.66	3.8440840	22,912.26
Ewing,	325	27	14.09	145	26	25.97	3.6636188	15,121.78
McDonald,*	35	43	45.7	215	40	45.6	4.0503035	36,837.31
		†			†		4.0502763	36,835.00
Hickman,*	358	07	04.4	178	07	14.0	4.0271348	34,923.60
		†			†		4.0271076	34,921.41
Dickson,*	117	40	04.8	297	34	52.5	4.1070426	.....
Weir,*	173	11	33.3	353	10	40.1	4.2101067	.....
Greentree,*	243	05	13.9	63	10	18.2	4.0926886	.....
Calhoun,*	294	06	16.4	114	14	59.9	4.3196701	.....
Shannon,*	311	13	32.8	131	18	26.2	4.1524041	.....

*From Hillside base.
†From Carnegie base.

APPENDIX E.

Mineral Production of Pennsylvania in 1912.

APPENDIX E.

MINERAL PRODUCTION IN 1912.

Introductory Note. In presenting this report of the mineral output of Pennsylvania for 1912 it is fully realized that it is far from perfect. The work has been done in co-operation with the United States Geological Survey, and it must be said that with the resources at the command of this Survey it would have been impossible to do this work without such co-operation.

A number of tables are introduced in this report which are of a general nature, and have been taken from the reports of the United States Geological Survey. These are introduced for the purpose of comparison and that the relative figures of the production of the entire United States and of other states may be convenient for comparison.

This brief review is divided into two general sections. First: a section treating of the production of various minerals as a whole within the State, and, secondly, a brief discussion and statement of the mineral production in each of the several counties.

GENERAL STATISTICS.

Pennsylvania not only stands second, next to New York, in the value of its manufactures, but far outranks all other States in the value of its mineral production, producing almost one-fourth of the entire mineral output of the United States. The total value of the mineral production of the United States in 1912 was $2,243,630,326, (including in this the value of pig iron), or a total value of $1,917,818,084 with the iron production reduced to an iron-ore basis, coke to a coal basis, etc.; of which sum Pennsylvania produced $445,790,022, or over 23 per cent. of the whole.

The marvelous growth of the United States is well shown by the increase in its mineral production. In 1880 the population of the United States was 50,189,209 and the value of the mineral output $364,928,298, or an average of $7.27 for each person in the United States. In 1910 the population had increased to 91,972,266 and the value of the mineral output had risen to $1,992,405,727, or an average of $21,66 for each person in the United States—almost three times the value per-capita of thirty years previous. Taking the figures for 1910 and eliminating the pig iron, etc., the average mineral production per capita in the United States was $18.24.

In 1910 the population of Pennsylvania was 7,665,111 and the value of the mineral output, excluding pig iron, coke, etc., was $414,112,373, or $54.03 for each resident of the State—three times the average of the United States.

The wonderful growth in mineral output in the country is shown in other ways. In 1882 the value of the coal production was $146,632,581 and in 1912 is was $695,606,071, an increase in thirty years of 370 per cent. The value of petroleum output in 1882 was $24,065,988, which had increased 6.8th times in 1912, to $163,802,334. In 1912 the production of pig iron exceeded the total production of all minerals in 1882 by $56,000,000, and the value of the coal output in 1912, $695,606,071, was 90 per cent. greater than the total mineral production of 1882.

The above comparisons show not only the wonderful growth of the mineral industry, but the vast drains being made on the total of our mineral wealth, and the necessity for the more careful and painstaking study of the modes of occurrence, the methods of production and the *practical* limits in quantity of our mineral reserves.

Of the total mineral production of 1912 the States east of the Mississippi River, comprising less than 30 per cent. of the total area of the United States, excluding Alaska, produced two-thirds of the total mineral output, and the four leading States, all east of

the Mississippi River, Pennsylvania, West Virginia, Illinois, and Ohio, producing 42 per cent. of the total.

Of the fourteen leading metals, fuels and structural materials, with a value of about two-thirds of the total of the mineral output of the United States, Pennsylvania leads in seven and is second in one; the other products being copper, gold, zinc, silver, lead and petroleum.

PRODUCTION AND VALUE OF PRINCIPAL METALS, FUELS, AND S

Mineral.	Principal Producing States in 1912 (in order of value).	1911.		
		Quantity.	Value.	Value by groups.
Metals (from domestic ores):				
Pig iron*, long tons,	Pennsylvania, Ohio, Illinois, New York.	22,303,603	$313,334,558	
Copper, pounds,	Arizona, Montana, Michigan, Utah.	1,097,232,749	137,154,092	
Gold, fine ounces,	California, Colorado, Alaska, Nevada.	4,687,053	96,890,000	
Zinc, short tons,	Missouri, New Jersey, Colorado, Wisconsin.	271,621	30,964,794	$647,486,814
Silver, fine ounces,	Nevada, Utah, Montana, Idaho.	60,399,400	32,615,700	
Lead, short tons,	Missouri, Idaho, Utah, Colorado.	405,863	36,527,670	
Fuels:				
Coal, short tons,	Pennsylvania, Illinois, West Virginia, Ohio.	496,371,126	626,565,211	
Petroleum, barrels,	California, Oklahoma, Illinois, West Virginia.	220,449,391	134,044,752	835,231,497
Natural gas,	West Virginia, Pennsylvania, Ohio, Oklahoma.	.....	74,621,534	
Structural materials:				
Clay products,	Pennsylvania, Ohio, Illinois, New Jersey.	.....	127,717,621	
Stone,	Pennsylvania Vermont, New York, Ohio.	.....	77,108,567	
Cement,* barrels,	Pennsylvania, California, Indiana, Missouri.	76,567,150	64,218,957	295,931,747
Sand and gravel, short tons,	Pennsylvania, New York, Ohio, Illinois.	66,846,959	21,158,583	
Slate,	Pennsylvania, Vermont, Maine, Virginia.	.....	5,723,019	

*Marketed production.

TRUCTURAL MATERIALS IN THE UNITED STATES, 1911 AND 1912.

1912.

Quantity.	Value.	Value by groups.	Increase (+) or Decresse (—) in Value.			
			By Minerals.		By Groups.	
			Amount.	Per cent.	Amount.	Per cent.
28,981,195	$402,378,453		+$89,043,895	28.42		
1,243,268,720	205,139,338		+ 67,985,246	49.57		
4,520,717	93,451,500		— 3,438,500	3.55		
323,907	44,699,166	$822,251,507	+ 13,734,372	44.35	+$174,764,693	26.99
63,766,800	39,197,500		+ 6,581,800	20.18		
415,395	37,385,550		+ 857,830	2.35		
534,466,580	695,606,071		+ 69,040,860	11.02		
222,113,218	163,802,234	943,972,362	+ 29,757,582	22.20	+ 108,740,865	13.02
.....	84,563,957		+ 9,942,423	13.32		
.....	136,307,111		+ 8,589,490	6.73		
.....	78,284,572		+ 1,176,005	1.52		
85,925,651	69,554,385	313,302,594	+ 5,335,428	8.31	+ 17,370,847	5.87
68,354,561	23,113,208		+ 1,954,625	9.24		
.....	6,043,318		+ 315,299	5.50		

Excluding pig iron, coke and other secondary products the total value of the production of Pennsylvania, $445,790,022, was but $5,000,000 less than the combined output of West Virginia, Illinois, Ohio and California, the next four States in the value of their mineral products, and the value of the coal output is almost equal to the total production of all kinds of West Virginia, Ohio, and Illinois, the three next largest producing States.

RANK OF STATES IN VALUE OF MINERAL PRODUCTION IN 1911 AND 1912.

State.	Principal Mineral Products in 1912 (in order of value).	1911.		1912.			
		Rank.	Value.	Rank.	Value.	Increase (+) or decrease (—).	Percentage of increase (+) or decrease (—).
Pennsylvania,	Coal, natural gas, clay products, cement,	1	$414,426,962	1	$445,790,022	+$31,363,060	+ 7.57
West Virginia,	Coal, natural gas, petroleum, clay products,	3	101,932,248	2	123,872,358	+ 21,940,110	+21.52
Illinois,	Coal, petroleum, clay products, stone,	2	106,275,115	3	123,068,867	+ 16,793,752	+15.80
Ohio,	Coal, clay products, petroleum, natural gas,	4	97,090,284	4	111,229,656	+ 14,139,372	+14.56
California,	Petroleum, gold, cement, clay products,	5	90,620,644	5	92,837,374	+ 2,216,730	+ 2.45
Michigan,	Copper, iron ore, cement, salt,	6	65,275,324	6	80,062,486	+ 14,787,162	+22.65
Montana,	Copper, silver, coal, gold,	7	53,498,194	7	71,620,873	+ 18,122,679	+33.88
Arizona,	Copper, gold, silver, zinc,	11	44,503,873	8	67,497,838	+ 22,993,965	+51.67
Minnesota,	Iron, ore, clay products, stone,	8	53,395,881	9	66,672,729	+ 13,276,848	+24.86
Missouri,	Zinc, lead, coal, clay products,	10	51,932,906	10	58,332,550	+ 6,399,644	+12.32
Colorado,	Gold, coal, zinc, silver,	9	62,522,416	11	58,167,399	+ 5,644,983	+10.75
Oklahoma,	Petroleum, coal, natural gas, cement,	13	43,036,253	12	53,614,130	+ 10,577,877	+24.58
Utah,	Copper, silver, lead, coal,	12	43,774,331	13	51,004,942	+ 7,230,611	+16.52
Indiana,	Coal, clay products, cement, stone,	14	37,430,187	14	42,239,193	+ 4,809,006	+12.85
Nevada,	Copper, gold, silver, zinc,	16	34,501,832	15	39,111,828	+ 4,609,996	+13.36
New York,	Clay products, stone, cement, iron ore,	17	34,317,594	16	38,406,473	+ 4,088,879	+11.91
New Jersey,	Clay products, zinc, cement, stone,	15	34,663,435	17	36,881,930	+ 2,218,495	+ 6.40
Alabama,	Coal, iron ore, clay products, stone,	18	28,005,785	18	30,641,983	+ 2,636,198	+ 9.41
Kansas,	Coal, natural gas, cement, clay products,	19	25,237,043	19	26,554,967	+ 1,317,924	+ 5.22
Iowa,	Coal, clay products, cement, stone,	20	21,112,896	20	22,900,350	+ 1,787,454	+ 8.47
Texas,	Petroleum, coal, clay products, cement,	24	18,798,837	21	22,797,015	+ 3,998,178	+21.27
Alaska,	Gold, copper, silver, tin,	21	20,866,122	22	22,724,833	+ 1,858,711	+ 8.91
Kentucky,	Coal, clay products, stone,	23	19,296,614	23	22,452,984	+ 3,156,370	+16.36
Idaho,	Lead, silver, gold, copper,	22	19,441,545	24	21,816,390	+ 2,374,845	+12.22
Tennessee,	Coal, copper, stone, phosphate rock,	25	17,809,882	25	19,362,209	+ 1,462,327	+ 8.17
Louisiana,	Petroleum, sulphur, natural gas,	28	12,710,958	26	15,357,841	+ 2,646,883	+20.82
Washington,	Coal, clay products, cement, stone,	26	15,865,277	27	15,347,313	— 517,964	— 3.26
Virginia,	Coal, clay products, iron ore, stone,	27	13,713,666	28	14,995,842	+ 1,282,276	+ 9.35
New Mexico,	Copper, coal, silver, zinc,	34	8,176,229	29	14,391,355	+ 6,215,126	+76.01

RANK OF STATES IN VALUE OF MINERAL PRODUCTION IN 1911 AND 1912—Continued.

State.	Principal Mineral Products in 1912 (in order of value).	1911.		1912.			
		Rank.	Value.	Rank.	Value.	Increase (+) or decrease (—).	Percentage of increase (+) or decrease (—).
Wisconsin,	Zinc, iron ore, stone, clay products,	29	12,032,158	30	14,192,287	+ 2,160,129	+17.95
Wyoming,	Coal, petroleum, iron ore, gypsum,	30	11,483,377	31	13,374,088	+ 1,890,711	+16.46
Maryland,	Coal, clay products, stone, cement,	32	9,386,515	32	10,916,671	+ 1,530,156	+16.30
Florida,	Phosphate rock, clay products, Fuller's earth, sand-lime brick,	31	10,250,228	33	10,272,594	+ 22,366	+ .22
Vermont,	Stone, slate, talc and soapstone,	33	8,434,516	34	9,113,912	+ 679,396	+ 8.05
South Dakota,	Gold, stone, silver,	35	8,047,259	35	8,436,240	+ 388,981	+ 4.83
Massachusetts,	Stone, clay products, lime,	36	6,623,077	36	6,654,514	+ 31,437	+ .47
Georgia,	Clay products, stone, coal, cement,	37	6,172,857	37	6,306,140	+ 133,283	+ 2.16
Arkansas,	Coal, bauxite, stone, clay products,	38	5,864,822	38	6,258,726	+ 393,904	+ 6.72

The above paragraphs are only given to indicate the enormous quantity and value of our Pennsylvania minerals, and to show by comparison how fast this mineral wealth is being drawn upon—to emphasize anew the importance of true conservation.

The following tables give the value of the mineral production of Pennsylvania for 1911 and 1912.

MINERAL PRODUCTION OF PENNSYLVANIA IN 1911 AND 1912.

Product.	1911.				1912.			
	Raw.		Derived.		Raw.		Derived.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Abrasives, artificial, pounds,	.....	.....	* †	* †	.....	.....	* †	* †
Briquets, fuel, short tons,	.....	.....	94,426	†$223,613	.....	.....	55,491	†$143,720
Bromine, pounds,	.....	.....	*	*	.....	.....	*	*
Calcium chloride, short tons,	.....	.....	*	*	.....	.....	*	*
Cement, barrels,	.....	.....	27,024,725	19,306,349	.....	.....	27,625,340	18,945,835
Clay products, short tons,	329,197	†$567,622	.....	20,270,033	462,605	†$741,484	.....	21,537,221
Coal:								
Anthracite, short tons,	90,464,067	175,189,392	.....	.....	84,361,598	177,622,626	.....	.....
Bituminous, short tons,	141,561,257	146,154,952	.....	.....	161,865,488	169,370,497	.....	.....
Coke, short tons,	.....	.....	21,923,935	†43,063,367	.....	.....	27,433,693	†66,267,838
Copper, pounds,	.....	.....	*	*	.....	.....	*	*
Feldspar, short tons,	13,284	101,090	.....	.....	9,451	71,287	.....	.....
Ferroalloys, long tons,	.....	.....	* †	* †	.....	.....	* †	* †
Gems and precious stones,	.....	.....	.....	300	.....	.....	.....	103
Gold, fine ounces (troy),	.....	.....	*	*	.....	.....	.....	.....
Graphite, pounds,	*	*	.....	.....	*	*	.....	.....
Iron ore, long tons,	514,929	539,353	.....	.....	522,172	481,353	.....	.....
Iron, pig, long tons,	.....	.....	9,581,109	†136,328,507	.....	.....	12,437,685	†181,569,299
Lime, short tons,	.....	.....	841,723	2,688,374	.....	.....	849,159	2,679,420
Millstone,	.....	.....	.....	*	.....	.....	.....	*
Mineral paints:								
Natural pigments, short tons,	.....	.....	26,749	262,520	.....	.....	33,326	284,082
Zinc-lead pigments, short tons,	.....	.....	*	*	.....	.....	*	*
Mineral waters, gallons sold,	2,327,732	216,819	.....	.....	2,192,106	204,906	.....	.....
Natural gas,	.....	18,520,796	.....	.....	.....	18,539,672	.....	.....
Petroleum, barrels,	8,248,158	10,894,074	.....	.....	7,837,948	12,886,752	.....	.....
Pyrite, long tons,	*	*	.....	.....	*	*	.....	.....
Quartz, short tons,	*	*	.....	.....	*	*	.....	.....
Salt, barrels,	.....	.....	*	*	.....	.....	*	*
Sand and gravel, short tons,	5,689,059	3,025,267	.....	.....	6,509,333	3,371,513	.....	.....
Sand-lime brick,	.....	.....	.....	*	.....	.....	.....	36,970
Silver, fine ounces (troy),	.....	.....	*	*	.....	.....	*	*
Slate,	.....	.....	.....	3,431,351	.....	.....	.....	3,474,247
Stone,	.....	‡	.....	‡3,147,505	.....	‡	.....	‡9,144,214
Sulphuric acid (60° Baume')§ short tons,	.....	.....	*	*	.....	.....	*	*
Talc, short tons,	‡	‡	*	*	‡	‡	*	*
Miscellaneous,	.....	99,147	.....	11,181,613	.....	36,855	.....	16,675,284
Total value, eliminating duplications,		$414,426,962				$445,790,022		

*Value included under "Miscellaneous." †Value not included in total value. ‡Raw product included in derived product. §From zinc smelters.

COAL.

GENERAL STATEMENT.

The quantity of anthracite coal mined fell from 90,464,067 *short* tons in 1911 to 84,361,598 short tons in 1912. This decrease was directly due to the six weeks suspension of work pending the adjustment of the wage scale, and the increase in price of anthracite coal is assignable to the increase in wages granted by that settlement. The average price of anthracite coal per *long* ton in 1911 was $2.17 and in 1912, $2.36.

In contrast with the decline in the anthracite output the bituminous production rose from 144,561,257 *short* tons in 1911 to 161,865,488 *short* tons in 1912.

The total production of both kinds of coal in 1912 was 246,227,086 *short* tons, which was 18 per cent. of the total production of the world. This total State output is more than that of any other country in the world except Great Britian and Germany, and is only 39,000,000 tons less than the output of Germany and 45,000,000 tons less than that of Great Britain. This output is greater than the combined output of Austria-Hungary, France, Russia, Belgium, Japan, China, India, Canada, New South Wales, Spain and the Transvaal, the fourth to fourteenth producing countries of the world, and the bituminous output alone almost equals that of Austria-Hungary, France, Russia, and Belgium, the fourth to seventh producing countries of the world.

The total production of coal in the United States is almost equal to the combined production of Great Britain and Germany, and is over twice the production of all the world, except Great Britain and Germany. The following table gives the production of coal in short tons for the various countries of the world, by which it will be seen the portion produced in the United States is 39 per cent.

THE WORLD'S PRODUCTION OF COAL.

Countries.	Equivalent of short tons.
United States (1912),	534,466,580
Great Britain (1912),	291,666,299
Germany (1912),	285,974,649
Austria-Hungary (1911),	54,960,298
France (1911),	43,242,778
Russia and Finland (1911),	29,361,764
Belgium (1911),	25,411,917
Japan (1911),	19,436,536
China (1911),	16,534,500
India (1911),	13,494,573
Canada (1911),	11,323,338
New South Wales (1911),	9,734,596
Spain (1910),	4,472,618
Transvaal (1911),	4,343,680
Natal (1911),	2,679,551
New Zealand (1910),	2,461,045
Mexico (1910),	1,653,450
Holland (1911),	1,628,097
Asiatic Russia (1910),	1,371,261
Chili (1911),	1,277,191
Queensland (1911),	998,556
Bosnia and Herzegovina (1911),	848,510
Turkey (1911),	799,168
Victoria (1911),	732,328
Italy (1911),	614,132
Dutch East Indies (1910),	589,980
Indo-China (1910),	549,593
Orange Free State (Orange River Colony) (1911),	482,690
Sweden (1911),	343,707
Peru (1910),	338,759
Servia (1910),	305,133
Western Australia (1910),	293,626
Formosa (1911),	280,999
Bulgaria (1909),	250,621
British Borneo (1910),	191,930
Rhodesia (1910),	180,063
Roumania (1907-8),	177,231
Korea (1911),	136,319
Tasmania (1910),	92,350
Cape Colony (Cape of Good Hope) (1911),	89,013
Spitzbergen (1911),	44,092
Brazil (1910),	16,535
Venezuela (1906),	15,503
Portugal (1910),	8,983
Philippine Islands (1912),	2,998
Switzerland,	2,756
Greece (1910),	1,653
Unspecified,	56,000
Total,	1,363,937,964
Percentage of the United States,	39

For the purpose of comparison the production of coal in various leading countries is shown in the accompanying table, by which it will be seen that the percentage of coal produced in the United States has risen from 14.07 per cent. in 1870 to 39 per cent. in 1912.

WORLD'S PRODUCTION OF COAL, BY COUNTRIES, 1870-1912.

Year.	United States.		Great Britain.		Germany.	
	Long tons.	Short tons.	Long tons.	Short tons.	Metric tons.	Short tons.
1870,	29,496,054	33,035,580	110,431,192	123,682,935	34,003,004	37,488,312
1880,	63,822,830	71,481,570	146,969,409	164,605,738	59,118,035	65,177,634
1890,	140,866,931	157,770,963	181,614,288	203,408,003	89,290,831	98,398,500
1900,	240,783,310	269,684,027	225,181,300	252,203,656	149,551,000	164,805,202
1910,	447,853,909	501,596,378	264,433,028	296,164,991	222,301,660	245,043,120
1911,	443,188,505	496,371,126	271,891,899	304,518,927	234,259,061	258,223,713
1912,	477,202,303	534,466,580	260,416,338	291,666,299	259,434,500	285,974,649

Year.	Austria-Hungary.		France.		Belgium.	
	Metric tons.	Short tons.	Metric tons.	Short tons.	Metric tons.	Short tons.
1870,	8,355,945	9,212,429	13,179,788	14,530,716	13,697,118	15,101,073
1880,	14,800,000	16,317,060	19,361,564	21,346,124	16,886,698	18,617,585
1890,	27,504,032	30,323,195	26,083,118	28,756,638	20,365,960	22,453,471
1900,	39,029,729	43,010,761	33,404,298	36,811,536	23,462,817	25,856,024
1910,	48,649,768	53,626,639	38,570,473	42,516,232	23,927,230	26,374,986
1911,	49,859,655	54,960,298	39,229,591	43,242,778	23,053,540	25,411,917
1912,	.....	.....	.....	.....	.....	.....

Year.	Russia.		Japan.		Other Countries.	Total.	Percentage of United States.
	Metric tons.	Short tons.	Metric tons.	Short tons.	Short tons.	Short tons.	
1870,	667,806	735,922	.....	.....	1,063,121	234,850,088	14.07
1880,	3,238,470	3,570,413	.....	.....	3,621,342	364,737,406	19.60
1890,	6,016,525	6,633,219	2,653,000	2,923,606	13,025,637	563,693,232	27.99
1900,	16,151,557	17,799,016	7,429,457	8,187,262	27,684,964	846,041,848	31.88
1910,	22,650,000	24,967,095	15,681,324	17,285,523	71,445,828	1,279,020,792	39.22
1911,	26,636,818	29,361,764	17,632,710	19,436,536	79,436,191	1,310,973,300	37.86
1912,	.....	.....	.....	.....	79,417,143	1,363,937,964	39.00

The following table gives the average price per short ton of coal in the United States from 1880 to 1912.

AVERAGE PRICE OF COAL IN THE UNITED STATES PER SHORT TON FOR 33 YEARS.

Year.	Anthracite.	Bituminous.	Year.	Anthracite.	Bituminous.
1880,	$1 47	$1 25	1897,	$1 51	$0 81
1881,	2 01	1 12	1898,	1 41	80
1882,	2 01	1 12	1899,	1 46	87
1883,	2 01	1 07	1900,	1 49	1 01
1884,	1 79	94	1901,	1 67	1 05
1885,	2 00	1 13	1902,	1 84	1 12
1886,	1 95	1 05	1903,	2 01	1 24
1887,	2 01	1 11	1904,	1 90	1 10
1888,	1 91	1 00	1905,	1 83	1 06
1889,	1 44	99	1906,	1 85	1 11
1890,	1 43	99	1907,	1 91	1 14
1891,	1 46	99	1908,	1 90	1 12
1892,	1 57	99	1909,	1 84	1 07
1893,	1 59	96	1910,	1 90	1 12
1894,	1 51	91	1911,	1 94	1 11
1895,	1 41	86	1912,	2 11	1 15
1896,	1 50	83			

That the rank of the several states may be better understood, the following tables show the production of each of the several states, for the years 1911 and 1912.

COAL PRODUCTION OF THE UNITED STATES IN 1911, BY STATES, IN SHORT TONS.

State.	Loaded at mines for shipment.	Sold to local trade and used by employes.	Used at mines for steam and heat.	Made into coke.	Total quantity.	Total value.	Average price per ton.	Average number of days active.	Average number of employes.
Alabama,	11,135,563	141,191	615,335	3,129,332	15,021,421	$19,079,949	$1.27	227	22,707
Arkansas,	1,996,803	16,560	93,426	.....	2,106,789	3,396,849	1.61	133	5,657
California and Alaska.	4,981	5,986	680	.....	11,647	23,297	2.00	265	60
Colorado,	8,104,712	303,473	324,947	1,424,251	10,157,383	14,747,764	1.45	207	14,316
Georgia and North Carolina.	86,161	1,007	5,435	72,677	165,330	246,448	1.49	277	514
Idaho and Nevada,	.....	1,791	30	.....	1,821	4,872	2.68	228	13
Illinois,	49,163,327	2,806,197	1,623,319	85,775	53,679,118	59,519,478	1.11	188	76,600
Indiana,	13,134,954	657,978	408,423	.....	14,201,355	15,326,808	1.08	182	21,182
Iowa.	6,594,899	532,519	204,230	.....	7,331,648	12,663,507	1.73	203	16,599
Kansas,	5,872,417	131,299	174,437	575	6,178,728	9,473,572	1.53	190	11,357
Kentucky.	12,988,064	614,937	331,204	115,498	14,049,703	14,008,458	.99	201	21,921
Maryland,	4,547,600	72,050	66,145	.....	4,685,795	5,197,066	1.11	243	5,881
Michigan,	1,347,144	70,127	58,803	.....	1,476,074	2,791,461	1.89	218	3,323
Missouri,	3,290,119	467,641	78,347	.....	3,836,107	6,603,066	1.72	182	10,259
Montana.	2,739,529	80,985	155,844	.....	2,976,358	5,342,168	1.79	220	3,866
New Mexico,	2,308,462	27,262	45,324	767,108	3,148,158	4,525,925	1.44	230	4,007
North Dakota.	359,075	130,655	12,898	.....	502,628	720,489	1.43	229	640
Ohio,	28,114,734	1,961,939	682,777	536	30,759,986	31,810,123	1.03	179	46,035
Oklahoma.	2,840,002	47,274	186,966	.....	3,074,242	6,291,494	2.05	156	8,790
Oregon,	22,407	10,216	14,038	.....	46,661	108,033	2.32	179	189
Pennsylvania, bituminous,	107,055,318	3,612,732	3,261,068	30,632,139	144,561,257	146,154,952	1.01	233	162,199
Tennessee.	5,751,404	97,643	122,146	161,963	6,433,156	7,209,734	1.12	232	10,706
Texas,	1,577,901	56,912	39,780	.....	1,974,593	3,273,288	1.66	226	5,353
Utah,	2,001,892	27,797	98,790	381,696	2,513,175	4,248,666	1.69	236	3,060
Virginia.	5,230,894	82,349	181,660	1,369,764	6,864,667	6,254,804	.94	261	7,392
Washington,	3,230,991	155,932	138,140	47,752	3,572,815	8,174,170	2.29	225	6,498
West Virginia.	54,171,423	1,045,547	1,073,907	3,540,703	59,831,580	53,670,515	.90	221	66,730
Wyoming,	6,386,936	83,932	273,996	.....	6,744,864	10,503,863	1.56	230	7,924
Total bituminous,	340,361,212	13,243,933	10,272,145	42,029,769	405,907,059	$451,375,819	$1.11	211	549,775
Pennsylvania, anthracite,	78,894,589	2,296,451	9,273,027	.....	90,464,067	175,189,392	1.94	246	172,585
Grand total,	419,255,801	15,540,384	19,545,172	42,029,769	496,371,126	$626,565,211	$1.26	220	722,360

COAL PRODUCTION OF THE UNITED STATES IN 1912, BY STATES, IN SHORT TONS.

State.	Loaded at mines for shipment.	Sold to local trade and used by employes.	Used at mines for steam and heat.	Made into coke.	Total quantity.	Total value.	Average price per ton.	Average number of days active.	Average number of employes.
Alabama,	13,372,521	147,586	664,019	1,916,474	16,100,600	$20,829,252	$1.29	245	22,613
Arkansas,	1,996,822	15,111	88,886	.....	2,100,819	3,582,789	1.71	157	4,536
California and Alaska,	3,748	3,960	3,625	.....	11,333	26,411	2.33	184	52
Colorado,	9,527,149	331,570	352,551	766,554	10,977,824	16,345,336	1.49	227	13,000
Georgia and North Carolina,	108,135	1,504	6,141	111,923	227,703	338,926	1.49	254	450
Idaho and Nevada,	500	2,414	50	.....	2,964	9,313	3.14	253	20
Illinois,	55,304,530	2,793,861	1,786,835	.....	59,885,226	70,294,338	1.17	194	78,068
Indiana,	14,179,686	704,229	401,803	.....	15,285,718	17,480,546	1.14	182	21,651
Iowa,	6,519,307	590,206	180,016	.....	7,289,529	13,152,088	1.80	188	16,370
Kansas,	6,662,834	129,978	192,595	775	6,986,182	11,324,130	1.62	202	11,646
Kentucky,	15,159,515	632,629	438,378	259,999	16,490,521	16,854,207	1.02	201	24,304
Maryland,	4,836,391	61,507	66,140	.....	4,961,038	5,839,079	1.18	259	6,162
Michigan,	1,080,319	62,411	63,500	.....	1,206,230	2,399,451	1.99	183	3,113
Missouri,	3,808,332	432,051	99,473	.....	4,339,856	7,633,864	1.76	206	9,704
Montana,	2,818,503	82,052	147,940	.....	3,048,495	5,558,195	1.82	220	3,440
New Mexico,	2,620,932	25,300	51,328	839,264	3,536,824	5,037,051	1.42	274	3,928
North Dakota,	354,895	132,951	11,634	.....	499,480	765,105	1.53	232	622
Ohio,	31,710,928	2,197,368	610,566	9,865	34,528,727	37,083,363	1.07	201	45,527
Oklahoma,	3,415,958	74,059	185,401	.....	3,675,418	7,867,331	2.14	174	8,785
Oregon,	14,361	19,646	7,630	.....	41,637	108,276	2.60	239	222
Pennsylvania, bituminous,	116,477,708	3,850,895	3,657,367	37,879,518	161,865,488	169,370,497	1.05	252	165,144
Tennessee,	5,802,779	85,654	137,382	477,413	6,473,228	7,379,903	1.14	234	10,309
Texas,	2,084,254	41,760	62,598	.....	2,188,612	3,656,744	1.67	230	5,127
Utah,	2,328,513	36,509	106,401	314,726	3,016,149	5,046,451	1.67	285	3,323
Virginia,	6,027,712	107,657	182,870	1,528,399	7,846,638	7,518,576	.96	251	8,678
Washington,	3,041,277	80,295	162,619	76,741	3,360,932	8,042,871	2.39	226	5,519
West Virginia,	60,549,194	1,209,142	1,251,670	3,776,681	66,786,687	62,792,234	.94	266	68,248
Wyoming,	6,993,263	83,388	291,473	.....	7,368,124	11,648,088	1.58	238	8,036
Total bituminous,	377,000,066	13,935,693	11,210,891	47,958,332	450,104,982	$517,983,445	$1.15	223	548,632
Pennsylvania, antbracite,	73,056,766	2,367,572	8,937,260	.....	84,361,598	177,622,626	2.11	231	174,030
Grand total,	450,056,832	16,303,265	20,148,151	47,958,332	534,466,580	$695,606,071	$1.30	225	722,662

That the changes in the price of coal may be better shown, in the following table the average price per ton in each of the several states is given for the years 1908 to 1912, from which it will be seen that during this time the lowest price was $1.20 per net ton, and the highest $1.30.

AVERAGE PRICE PER SHORT TON FOR COAL AT THE MINES SINCE 1908, BY STATES AND TERRITORIES.

State or Territory.	1908	1909	1910	1911	1912	Advance (+) or decline (—) in 1912.
Alabama,	$1.26	$1.19	$1.26	$1.27	$1.29	+$0.02
Arkansas,	1.68	1.48	1.56	1.61	1.71	+ 10
California,	3.19	2.21	2.74	2.00	2.33	+ 33
Colorado,	1.41	1.33	1.42	1.45	1.49	+ 04
Georgia,	1.38	1.41	1.46	1.49	1.49	.....
Idaho,	4.02	4.27	3.92	2.68	3.14	+ 46
Illinois,	1.05	1.05	1.14	1.11	1.17	+ 06
Indiana,	1.06	1.02	1.13	1.08	1.14	+ 06
Iowa,	1.63	1.65	1.75	1.73	1.80	+ 07
Kansas,	1.49	1.44	1.61	1.53	1.62	+ 09
Kentucky,	1.01	.94	.99	.99	1.02	+ 03
Maryland,	1.17	1.11	1.12	1.11	1.18	+ 07
Michigan,	1.81	1.79	1.91	1.78	1.99	+ 21
Missouri,	1.64	1.65	1.79	1.72	1.76	+ 04
Montana,	1.96	1.97	1.82	1.79	1.82	+ 03
New Mexico,	1.37	1.29	1.39	1.44	1.42	— 02
North Dakota,	1.63	1.56	1.49	1.43	1.53	+ 10
Ohio,	1.06	99	1.05	1.03	1.07	+ 04
Oklahoma,	2.03	2.00	2.22	2.05	2.14	+ 09
Oregon,	2.74	2.69	3.48	2.32	2.60	+ 28
Pennsylvania, bituminous,	1.01	94	1.02	1.01	1.05	+ 04
Tennessee,	1.15	1.09	1.11	1.12	1.14	+ 02
Texas,	1.80	1.72	1.67	1.66	1.67	+ 01
Utah,	1.69	1.66	1.68	1.69	1.67	— 02
Virginia,	.91	.89	.90	.91	.96	+ 05
Washington,	2.21	2.54	2.50	2.29	2.39	+ 10
West Virginia,	.95	.86	.92	.90	.94	+ 04
Wyoming,	1.62	1.55	1.55	1.56	1.58	+ 02
Total bituminous,	$1.12	$1.07	$1.12	$1.11	$1.15	+$0.04
Pennsylvania, anthracite,	1.90	1.84	1.90	1.94	2.11	+ 17
General average,	$1.28	$1.20	$1.25	$1.26	$1.30	+$0.04

The following table gives the production of coal in Pennsylvania, as also the total production of the United States, for the years 1880 to 1912, showing the portion of the total produced in this State.

PRODUCTION OF PENNSYLVANIA COAL COMPARED WITH TOTAL PRODUCTION OF THE UNITED STATES, 1880-1912, IN SHORT TONS.

Year.	Total United States.	Pennsylvania.	Percentage of Pennsylvania to total.	Year.	Total United States.	Pennsylvania.	Percentage of Pennsylvania to total.
1880, ...	71,481,570	47,074,975	66	1897, ...	200,223,665	107,029,654	53
1881, ...	85,881,030	54,320,018	63	1898, ...	219,976,267	118,547,777	54
1882, ...	103,285,789	57,254,507	55	1899, ...	253,741,192	134,568,180	53
1883, ...	115,212,125	62,488,190	54	1900, ...	269,684,027	137,210,241	51
1884, ...	119,735,051	62,404,488	52	1901, ...	293,299,816	149,777,613	51
1885, ...	110,957,522	62,137,271	56	1902, ...	301,590,439	139,947,962	46
1886, ...	112,743,403	62,857,210	56	1903, ...	357,356,416	177,724,246	49.7
1887, ...	129,975,557	70,372,857	54	1904, ...	351,816,398	171,094,996	49
1888, ...	148,659,402	77,719,624	52	1905, ...	392,722,635	196,073,487	49.9
1889, ...	141,229,514	81,719,059	58	1906, ...	414,157,278	200,575,617	48.4
1890, ...	157,770,963	88,770,814	56	1907, ...	480,363,424	235,747,489	49.1
1891, ...	168,566,668	93,453,921	55	1908, ...	415,842,698	200,448,281	48.2
1892, ...	179,329,071	99,167,080	55	1909, ...	460,814,616	219,037,150	47.5
1893, ...	182,352,774	98,038,267	54	1910, ...	501,596,378	235,006,762	46.9
1894, ...	170,741,526	91,833,584	54	1911, ...	496,371,126	235,025,324	47.4
1895, ...	193,117,530	108,216,565	56	1912, ...	534,466,580	246,227,086	46.1
1896, ...	191,986,357	103,903,534	54				

The rank of the several states as regards coal production for the years 1911 and 1912, the total quantity produced in each, and the percentage of the total output, together with the values, are shown in the following tables.

RANK OF COAL-PRODUCING STATES IN 1911 AND 1912, WITH QUANTITY AND VALUE OF PRODUCT AND PERCENTAGE OF EACH, 1911.

Production.				Value.			
Rank.	State or Territory.	Quantity (short tons).	Percentage of total production.	Rank.	State or Territory.	Quantity (short tons).	Percentage of total production.
1	Pennsylvania:			1	Pennsylvania:		
	Anthracite,	90,464,067	18.2		Anthracite,	$175,189,392	28.0
	Bituminous,	144,561,257	29.1		Bituminous,	146,154,952	23.3
2	West Virginia,	59,831,530	12.1	2	Illinois,	59,519,478	9.5
3	Illinois,	53,679,118	10.8	3	West Virginia,	53,670,515	8.6
4	Ohio,	30,759,986	6.2	4	Ohio,	31,810,123	5.1
5	Alabama,	15,021,421	3.0	5	Alabama,	19,079,949	3.0
6	Indiana,	14,291,335	2.9	6	Indiana,	15,326,803	2.4
7	Kentucky,	14,049,703	2.8	7	Colorado,	14,747,764	2.4
8	Colorado,	10,157,383	2.1	8	Kentucky,	14,008,458	2.3
9	Iowa,	7,331,648	1.5	9	Iowa,	12,663,507	2.0
10	Virginia,	6,864,667	1.4	10	Wyoming,	10,508,863	1.7
11	Wyoming,	6,744,864	1.4	11	Kansas,	9,473,572	1.5
12	Tennessee,	6,433,156	1.3	12	Washington,	8,174,170	1.3
13	Kansas,	6,178,728	1.2	13	Tennessee,	7,209,734	1.1
14	Maryland,	4,685,795	.9	14	Missouri,	6,603,066	1.1
15	Missouri,	3,836,107	.8	15	Oklahoma,	6,291,494	1.0
16	Washington,	3,572,815	.7	16	Virginia,	6,254,804	1.0
17	New Mexico,	3,148,158	.6	17	Montana,	5,342,168	.9
18	Oklahoma,	3,074,242	.6	18	Maryland,	5,197,066	.8
19	Montana,	2,976,358	.6	19	New Mexico,	4,525,925	.7
20	Utah,	2,513,175	.5	20	Utah,	4,248,666	.7
21	Arkansas,	2,106,789	.4	21	Arkansas,	3,396,849	.5
22	Texas,	1,974,593	.4	22	Texas,	3,273,288	.5
23	Michigan,	1,476,074	.3	23	Michigan,	2,791,461	.4
24	North Dakota,	502,628	.1	24	North Dakota,	720,489	.1
25	Georgia and North Carolina,	165,330	.1	25	Georgia and North Carolina,	246,448	.1
26	Oregon,	46,661		26	Oregon,	108,033	
27	California and Alaska,	11,647		27	California and Alaska,	23,297	
28	Idaho and Nevada,	1,821		28	Idaho and Nevada,	4,872	
	Total,	496,371,126	100.0		Total,	$626,565,211	100.0

RANK OF COAL-PRODUCING STATES IN 1911 AND 1912, WITH QUANTITY AND VALUE OF PRODUCT AND PERCENTAGE OF EACH, 1912—Con'd.

Production.				Value.			
Rank.	State or Territory.	Quantity (short tons).	Percentage of total production.	Rank.	State or Territory.	Value.	Percentage of total production.
1	Pennsylvania:			1	Pennsylvania:		
	Anthracite,	84,361,598	15.8		Anthracite,	$177,622,626	25.6
	Bituminous,	161,865,488	30.3		Bituminous,	169,370,497	24.4
2	West Virginia,	66,786,687	12.5	2	Illinois,	70,294,338	10.1
3	Illinois,	59,885,226	11.2	3	West Virginia,	62,792,234	9.0
4	Ohio,	34,528,727	6.4	4	Ohio,	37,083,363	5.3
5	Kentucky,	16,490,521	3.1	5	Alabama,	20,829,252	3.0
6	Alabama,	16,100,600	3.0	6	Indiana,	17,480,546	2.5
7	Indiana,	15,285,718	2.8	7	Kentucky,	16,854,207	2.4
8	Colorado,	10,977,824	2.0	8	Colorado,	16,345,336	2.4
9	Virginia,	7,846,633	1.5	9	Iowa,	13,152,088	1.9
10	Wyoming,	7,368,124	1.4	10	Wyoming,	11,648,088	1.7
11	Iowa,	7,289,529	1.4	11	Kansas,	11,324,130	1.6
12	Kansas,	6,986,182	1.3	12	Washington,	8,042,871	1.2
13	Tennessee,	6,473,228	1.2	13	Oklahoma,	7,867,331	1.1
14	Maryland,	4,964,033	.9	14	Missouri,	7,633,864	1.1
15	Missouri,	4,339,856	.8	15	Virginia,	7,518,576	1.1
16	Oklahoma,	3,675,413	.7	16	Tennessee,	7,379,903	1.1
17	New Mexico,	3,536,824	.7	17	Maryland,	5,839,079	.8
18	Washington,	3,360,932	.6	18	Montana,	5,558,195	.8
19	Montana,	3,048,495	.6	19	Utah,	5,046,451	.7
20	Utah,	3,016,149	.6	20	New Mexico,	5,037,051	.7
21	Texas,	2,188,612	.4	21	Texas,	3,655,744	.5
22	Arkansas,	2,100,819	.4	22	Arkansas,	3,582,789	.5
23	Michigan,	1,206,230	.2	23	Michigan,	2,399,451	.3
24	North Dakota,	499,480	.1	24	North Dakota,	765,105	.1
25	Georgia and North Carolina,	227,703	.1	25	Georgia and North Carolina,	338,926	.1
26	Oregon,	41,637		26	Oregon,	108,276	
27	California and Alaska,	11,833		27	California and Alaska,	26,441	
28	Idaho and Nevada,	2,964		28	Idaho and Nevada,	9,313	
	Total,	534,466,589	100.0		Total,	$695,606,071	100.0

There is considerable difference in the conditions attending the mining of coal in the various states, and therefore in the quantity of coal produced per man, and the following table gives the average number of days worked, the hours, and the average production per man, for the years 1911 and 1912.

AVERAGE PRODUCTION PER MAN COMPARED WITH HOURS WORKED PER DAY, AND AVERAGE NUMBER OF DAYS PER YEAR IN 1911 AND 1912.

State.	1911.				1912.			
	Number of hours per day.	Days worked.	Average Tonnage.		Number of hours per day.	Days worked.	Average Tonnage.	
			Per year.	Per day.			Per year.	Per day.
Alabama,	9 and 10	227	662	2.92	9 and 10	245	712	2.91
Arkansas,	8	133	372	2.80	8	157	463	2.95
Colorado,	8 and 10	207	710	3.42	8 and 10	227	844	3.72
Illinois,	8	188	701	3.73	8	194	767	3.95
Indiana,	8	182	670	3.68	8	182	706	3.88
Iowa,	8	203	442	2.18	8	188	445	2.37
Kansas,	8	189	544	2.86	8	202	600	2.97
Kentucky,	8, 9 and 10	191	640	3.18	8, 9 and 10	201	679	3.38
Maryland,	10	243	797	3.21	10	259	806	3.11
Michigan,	8	218	444	2.04	8	183	387	2.11
Missouri,	8	182	374	2.05	8	206	447	2.17
Montana,	8	220	770	3.50	8	220	886	4.03
New Mexico,	10	230	788	3.41	10	274	900	3.28
Ohio,	8	179	668	3.73	8	201	758	3.77
Oklahoma,	8	156	350	2.24	8	174	418	2.4
Pennsylvania:								
Anthracite,	9	246	524	2.13	9	231	485	2.1
Bituminous,	8	233	859	3.69	8	252	980	3.89
Tennessee,	9 and 10	232	601	2.59	9 and 10	234	623	2.68
Utah,	8	236	821	3.48	8	235	906	3.13
Virginia,	10	261	929	3.56	10	251	904	3.6
Washington,	8	225	550	2.44	8	226	609	2.69
West Virginia,	9 and 10	221	896	4.05	8, 9 and 10	266	979	3.68
Wyoming,	8	230	851	3.70	8	238	917	3.85

It has long been known that the production of coal in this country has increased at a geometrical ratio, and the following table gives the total output of coal by averages of five years 1876 to 1912.

PRODUCTION OF ANTHRACITE AND BITUMINOUS COAL SINCE 1876, BY AVERAGES OF FIVE YEAR PERIODS IN SHORT TONS.

Period.	Anthracite.		Bituminous.	
	Quantity.	Percentage of total.	Quantity.	Percentage of total.
1876-1880,	25,800,169	41.44	36,460,776	58.56
1881-1885,	36,198,188	33.74	71,092,930	66.26
1886-1890,	43,951,763	31.76	94,446,451	68.24
1891-1895,	63,405,187	29.87	125,416,327	70.13
1896-1900,	55,625,265	24.49	171,498,143	75.51
1901-1905,	66,353,778	19.70	272,503,363	80.30
1906-1910,	81,142,214	17.85	373,412,644	82.15
1911,	90,464,067	18.2	405,907,069	81.8
1912,	84,361,598	15.8	450,104,982	84.2

ANTHRACITE COAL.

In the report of mineral production for 1911 there was a short account of the growth and development of the anthracite industry. The year 1912 presented but little change aside from a reduction in output from 90,464,067 short tons to 84,361,598 short tons. This decrease was due to the suspension of work pending the adjustment of the wage scale in April and May. The average price of anthracite coal in 1912 was $2.36 per long ton, an increase of 19 cents over the price in 1911. This increase in price was directly due to the increase granted by the wage settlement.

The following table gives the different sections of the anthracite field, and the names by which they are known locally and in the trade.

ANTHRACITE COAL FIELDS, BY FIELD, LOCAL DISTRICT, AND TRADE REGION.

Coal Field or Basin.	Local District.	Trade Region.
Northern.	Carbondale, Scranton, Pittston, Wilkes-Barre, Plymouth, Kingston,	Wyoming.
Eastern middle.	Green Mountain, Black Creek, Hazleton, Beaver Meadow, Panther Creek,	Lehigh.
Southern.	East Schuylkill, Western Schuylkill, Lorberry, Lykens Valley,	Schuylkill.
Western middle.	East Mahanoy, West Mahanoy, Shamokin,	

The anthracite fields are reached by 11 so-called initial railroads, as follows:

Philadelphia & Reading Railway.
Lehigh Valley Railroad.
Central Railroad of New Jersey.
Delaware, Lackawanna & Western Railroad.
Delaware & Hudson Co.'s Railroad.
Pennsylvania Railroad.
Erie Railroad.
New York, Ontario & Western Railway.
Delaware, Susquehanna & Schuylkill Railroad (part of Lehigh Valley system).
New York, Susquehanna & Western Railroad (part of Erie system).
Lehigh & New England Railroad.

The following table giving the production of anthracite from the years 1820 to 1912, does not include coal sold locally or that used in the operation of the mines and washeries, nor does it include the coal mined in Sullivan county, embracing only the coal shipped from the Lehigh, Schuylkill and Wyoming regions.

ANNUAL SHIPMENTS FROM THE SCHUYLKILL, LEHIGH, AND WYOMING REGIONS, 1820-1912, IN LONG TONS.

Year.	Schuylkill Region.		Lehigh Region.		Wyoming Region.		Total.
	Quantity.	Percentage.	Quantity.	Percentage.	Quantity.	Percentage.	Quantity.
1820,	.....	.....	365	.....	.....	.....	365
1821,	.....	.....	1,073	.....	.....	.....	1,073
1822,	1,480	39.79	2,240	60.21	.....	.....	3,720
1823,	1,128	16.23	5,823	83.77	.....	.....	6,951
1824,	1,567	14.10	9,541	85.90	.....	.....	11,108
1825,	6,500	18.60	28,393	81.40	.....	.....	34,893
1826,	16,767	34.90	31,280	65.10	.....	.....	48,047
1827,	31,360	49.44	32,074	60.66	.....	.....	63,434
1828,	47,284	61.00	30,232	39.00	.....	.....	77,616
1829,	79,973	71.35	25,110	22.40	7,000	6.25	112,083
1830,	89,984	61.50	41,750	23.90	43,000	24.60	174,734
1831,	81,854	46.29	40,966	23.17	54,000	30.54	176,820
1832,	209,271	57.61	70,000	19.27	84,000	23.12	363,271
1833,	252,971	51.87	123,001	25.22	111,777	22.91	487,749
1834,	226,692	60.19	106,244	28.21	43,700	11.60	376,636
1835,	339,508	60.54	131,250	23.41	90,000	16.05	560,758
1836,	432,045	63.16	148,211	21.66	103,861	15.18	684,117
1837,	530,152	60.98	223,902	25.75	115,387	13.27	869,441
1838,	446,875	60.49	213,666	28.92	78,207	10.59	738,697
1839,	475,077	58.05	221,025	27.01	122,300	14.94	818,402
1840,	490,596	56.75	225,313	26.07	148,470	17.18	864,379
1841,	624,466	65.07	143,037	14.90	192,270	20.03	959,773
1842,	583,273	52.62	272,540	24.69	252,599	22.79	1,108,412
1843,	710,200	56.21	267,793	21.19	285,605	22.60	1,263,598
1844,	887,937	54.45	377,092	23.12	365,911	22.43	1,630,850
1845,	1,131,724	56.22	429,453	21.33	451,836	22.46	2,013,013
1846,	1,308,500	55.82	617,116	22.07	518,389	22.11	2,344,005
1847,	1,665,735	67.79	633,507	21.98	583,067	20.23	2,882,309
1848,	1,733,721	56.12	670,321	21.70	685,196	22.18	3,089,238
1849,	1,728,600	53.30	781,556	24.10	732,910	22.60	3,242,966
1850,	1,840,620	54.80	690,456	20.56	827,823	24.64	3,358,899
1851,	2,323,525	52.34	964,224	21.68	1,156,167	25.98	4,443,916
1852,	2,636,835	52.81	1,072,136	21.47	1,284,500	25.72	4,993,471
1853,	2,665,110	51.30	1,054,309	20.49	1,475,732	28.41	5,195,151
1854,	3,191,670	53.14	1,207,186	20.13	1,603,478	26.73	6,002,334
1855,	3,552,943	53.77	1,284,113	19.43	1,771,511	26.80	6,608,567
1856,	3,603,029	52.91	1,351,970	19.52	1,972,581	28.47	6,927,580
1857,	3,373,797	50.77	1,318,641	19.84	1,952,603	29.39	6,644,941
1858,	3,273,245	47.36	1,389,030	20.18	2,186,094	31.96	6,339,369
1859,	3,448,708	44.16	1,623,311	20.86	2,731,236	34.98	7,808,255
1860,	3,749,632	44.04	1,821,674	21.40	2,941,817	34.56	8,513,123
1861,	3,160,747	39.74	1,738,377	21.85	3,055,140	38.41	7,954,264
1862,	3,372,583	42.86	1,351,054	17.17	3,145,770	39.97	7,869,407
1863,	3,911,683	40.90	1,894,713	19.80	3,759,610	39.30	9,566,006
1864,	4,161,970	40.89	2,054,669	20.19	3,960,836	38.92	10,177,475
1865,	4,356,959	45.14	2,040,913	21.14	3,254,519	33.72	9,652,391
1866,	5,787,902	45.56	2,179,364	17.15	4,736,616	37.29	12,703,882
1867,	5,161,671	39.74	2,502,054	19.27	5,325,000	40.99	12,988,725
1868,	5,330,737	38.52	2,502,582	18.13	5,968,146	43.25	13,801,465
1869,	5,775,138	41.66	1,949,673	14.06	6,141,369	44.28	13,866,180
1870,	4,968,157	30.70	3,239,374	20.02	7,974,660	49.28	16,182,191
1871,	6,552,772	41.74	2,235,707	14.24	6,911,242	44.02	15,699,721
1872,	6,694,890	34.03	3,873,339	19.70	9,101,549	46.27	19,699,778
1873,	7,212,601	33.97	3,705,596	17.46	10,309,755	48.57	21,227,952
1874,	6,866,877	34.09	3,773,836	18.73	9,504,408	47.18	20,145,121
1875,	6,231,712	31.87	2,834,605	14.38	10,696,155	53.75	19,712,472

ANNUAL SHIPMENTS FROM THE SCHUYLKILL, LEHIGH, AND WYOMING REGIONS, 1820-1912, IN LONG TONS—Continued.

Year.	Schuylkill Region.		Lehigh Region.		Wyoming Region.		Total.
	Quantity.	Percentage.	Quantity.	Percentage.	Quantity.	Percentage.	Quantity.
1876,	6,221,934	33.63	3,854,919	20.84	8,424,158	45.53	18,501,011
1877,	8,195,042	39.35	4,332,760	20.80	8,300,377	39.85	20,828,179
1878,	6,282,226	35.68	3,237,449	18.40	8,085,587	45.92	17,605,262
1879,	8,960,829	34.28	4,595,567	17.58	12,586,293	48.14	26,142,689
1880,	7,554,742	32.25	4,463,221	19.05	11,419,279	48.72	23,437,242
1881,	9,253,958	32.46	5,294,676	18.58	13,951,383	48.96	28,500,017
1882,	9,459,288	32.48	5,689,437	19.54	13,971,371	47.98	29,120,096
1883,	10,074,726	31.69	6,113,809	19.23	15,604,492	49.08	31,793,027
1884,	9,478,314	30.85	5,562,226	18.11	15,677,753	51.04	30,718,293
1885,	9,488,426	30.01	5,898,634	18.65	16,236,470	51.34	31,623,530
1886,	9,381,407	29.19	5,723,129	17.89	17,031,826	52.82	32,136,362
1887,	10,609,028	30.63	4,347,061	12.55	19,684,929	56.82	34,641,018
1888,	10,654,116	27.93	5,639,236	14.78	21,852,366	57.29	38,145,718
1889,	10,486,185	29.28	6,294,073	17.57	19,036,835	53.15	35,817,093
1890,	10,867,822	29.68	6,329,658	17.28	19,417,979	53.04	36,615,459
1891,	12,741,258	31.50	6,381,838	15.78	21,325,240	52.72	40,448,336
1892,	12,626,784	30.14	6,451,076	15.40	22,815,480	54.46	41,893,340
1893,	12,357,444	28.68	6,892,352	15.99	23,839,741	55.33	43,089,537
1894,	12,035,005	29.08	6,705,434	16.20	22,650,761	54.72	41,391,200
1895,	14,269,932	30.68	7,298,124	15.69	24,943,421	56.63	46,511,477
1896,	13,097,571	30.34	6,490,441	15.03	23,589,473	54.63	43,177,485
1897,	12,181,061	29.26	6,249,540	15.00	23,207,263	55.74	41,637,864
1898,	12,078,875	28.83	6,253,109	14.92	23,567,767	56.25	41,899,751
1899,	14,199,009	29.79	6,887,909	14.45	26,578,286	55.76	47,665,204
1900,	13,502,732	29.94	6,918,627	15.33	24,686,125	54.73	45,107,484
1901,	16,019,591	29.92	7,211,974	13.45	30,337,036	56.63	53,568,601
1902,	8,471,391	27.15	3,470,736	11.12	19,258,763	61.73	31,200,890
1903,	16,474,790	27.75	7,164,783	12.07	35,723,258	60.18	59,362,831
1904,	16,379,293	28.49	7,107,220	12.36	34,006,009	59.15	57,492,522
1905,	17,703,099	28.83	7,849,205	12.78	35,857,897	58.39	61,410,201
1906,	16,011,285	28.75	7,046,617	12.65	32,640,693	58.60	55,698,595
1907,	20,141,288	30.01	8,320,653	12.41	38,638,452	57.58	67,100,393
1908,	18,006,464	27.85	7,786,255	12.04	38,872,295	60.11	64,665,014
1909,	16,864,147	27.21	7,532,271	12.16	37,573,467	60.63	61,969,885
1910,	17,845,020	27.49	8,627,539	13.29	38,433,227	59.22	64,905,786
1911,	19,375,869	27.70	9,775,018	13.97	40,803,912	58.33	69,954,299
1912,	18,013,406	28.32	8,571,861	13.47	37,025,311	58.21	63,610,578
Total,	594,758,510	31.59	291,829,976	15.50	996,372,777	52.91	1882,961,263

The change in the proportion of sizes demanded by the trade continued during the year 1912. In 1890 the proportion of sizes above "Pea" was 76.9 per cent. of the total output, and that of sizes of "Pea" and smaller, was 23.1 per cent. In 1907 this proportion had changed so that the sizes above "Pea" had fallen to 58.6 per cent., and that of "Pea" or smaller had increased to 41.4 per cent. The following table shows the shipments, and the sizes shipped, in the years 1890 (when the first washery was installed) 1907-1908-1909-1910-1911-1912, in long tons.

SHIPMENTS OF ANTHRACITE, ACCORDING TO SIZES, 1890-1912, IN LONG TONS.

Year.	Sizes above pea.		Pea and smaller.		Total shipments.
	Quantity.	Percentage.	Quantity.	Percentage.	
1890,	28,154,678	76.9	8,460,781	23.1	36,615,459
1891,	30,604,566	75.7	9,843,770	24.3	40,448,336
1892,	31,868,278	76.0	10,025,042	24.0	41,893,320
1893,	32,294,233	74.9	10,795,304	25.1	43,089,537
1894,	30,482,203	73.7	10,908,997	26.3	41,391,200
1895,	32,469,367	69.9	14,042,110	30.1	46,511,477
1896,	30,354,797	70.3	12,822,688	29.7	43,177,485
1897,	28,510,370	68.5	13,127,494	31.5	41,637,864
1898,	28,198,532	67.3	13,701,219	32.7	41,899,751
1899,	31,506,700	66.1	16,158,504	33.9	47,665,204
1900,	29,162,459	64.7	15,945,025	35.3	45,107,484
1901,	34,412,974	64.2	19,155,627	35.8	53,568,601
1902,	19,025,632	61.0	12,175,258	39.0	31,200,890
1903,	37,738,510	63.6	21,624,321	36.4	59,362,831
1904,	35,636,661	62.0	21,855,861	38.0	57,492,522
1905,	37,425,217	60.9	23,984,984	39.1	61,410,201
1906,	32,894,124	59.1	22,804,471	40.9	55,698,595
1907,	39,332,856	58.6	27,776,538	41.4	67,109,393
1908,	38,319,325	59.3	26,345,689	40.7	64,665,014
1909,	36,437,762	58.1	*26,250,597	41.9	*62,688,359
1910,	38,415,323	58.5	*27,297,438	41.5	*65,712,761
1911,	41,728,071	59.2	*28,696,126	40.8	*70,424,197
1912,	39,538,583	60.6	*25,662,670	39.4	*65,201,253

*Exclusive of coal recovered by river dredges.

Following the report of production by counties, as given in the report for 1911, the following table shows the output of the several sizes of coal in each of the counties producing anthracite during the years 1911 and 1912.

QUANTITY OF EACH SIZE OF ANTHRACITE SHIPPED FROM EACH COUNTY IN 1911 AND 1912, IN LONG TONS, AND PERCENTAGE OF TOTAL.

1911.

County.	Lump and steamboat.	Broken.	Egg.	Stove.
Carbon,	20,158	173,761	283,119	368,218
Columbia,	16,395	6,488	105,783	141,185
Dauphin,	.....	24,562	47,729	108,862
Lackawanna,	21,266	569,843	2,132,722	3,700,818
Luzerne,	189,113	1,684,729	3,636,823	5,260,157
Northumberland,	18,962	199,949	496,441	1,054,065
Schuylkill,	265,105	922,331	1,651,102	2,255,032
Sullivan,	.....	12,919	54,907	74,780
Susquehanna,	.....	37,503	55,639	99,865
Total,	530,999	3,632,090	8,464,265	13,062,982
Percentage of total,	0.76	5.16	12.02	18.55

County.	Chestnut.	Pea.	Buckwheat No. 1.	Buckwheat No. 2 and rice.
Carbon,	549,793	338,719	372,147	278,778
Columbia,	209,097	121,523	172,920	132,193
Dauphin,	93,816	55,040	139,580	141,599
Lackawanna,	4,345,345	2,225,293	2,371,171	1,799,528
Luzerne,	6,618,953	2,772,594	3,117,826	1,688,735
Northumberland,	1,208,915	687,719	1,025,962	641,347
Schuylkill,	2,775,099	1,926,524	2,556,601	1,536,952
Sullivan,	109,371	75,195	.....	.....
Susquehanna,	127,346	79,442	80,431	20,002
Total,	16,037,735	8,282,049	9,836,638	6,239,134
Percentage of total,	22.77	11.76	13.97	8.86

County.	Buckwheat No. 3 and barley.	Screenings.	Total.
Carbon,	126,828	1,154	2,612,675
Columbia,	13,244	.....	918,828
Dauphin,	38,913	1,563	651,664
Lackawanna,	1,723,354	15,914	18,911,259
Luzerne,	1,331,623	93,005	26,393,558
Northumberland,	128,101	5,902	5,467,363
Schuylkill,	505,663	33,076	14,427,485
Sullivan,	.....	263,224	590,396
Susquehanna,	60,741	.....	550,969
Total,	3,924,467	413,838	70,424,197
Percentage of total,	6.57	0.69	100.00

QUANTITY OF EACH SIZE OF ANTHRACITE SHIPPED FROM EACH COUNTY IN 1911 AND 1912, IN LONG TONS, AND PERCENTAGE OF TOTAL—Continued.

1912.

County.	Lump and steamboat.	Broken.	Egg.	Stove.
Carbon,	12,465	164,130	253,626	300,390
Columbia,	20,593	11,547	145,855	149,906
Dauphin,	.....	26,688	38,272	132,250
Lackawanna,	17,229	578,994	2,230,739	3,212,447
Luzerne,	152,717	1,790,303	3,752,474	4,778,433
Northumberland,	11,200	228,907	639,230	962,872
Schuylkill,	204,397	924,307	1,764,971	2,140,653
Sullivan,	.....	11,298	51,946	72,796
Susquehanna,	.....	18,393	57,951	79,653
Total,	418,601	3,754,567	8,935,064	11,829,400
Percentage of total,	0.64	5.76	13.70	18.14

County.	Chestnut.	Pea.	Buckwheat No. 1.	Buckwheat No. 2 and Rice.
Carbon,	425,749	293,306	309,092	292,090
Columbia,	210,383	108,780	151,662	121,616
Dauphin,	97,202	54,730	121,830	132,583
Lackawanna,	3,785,627	1,842,760	2,012,050	929,564
Luzerne,	6,026,189	2,463,387	2,722,603	1,208,348
Northumberland,	1,154,954	624,010	947,283	550,698
Schuylkill,	2,696,948	1,695,045	2,369,046	1,430,942
Sullivan,	103,581	63,050	.....	.....
Susquehanna,	100,449	56,171	64,602	25,818
Total,	14,601,082	7,206,239	8,698,173	4,691,659
Percentage of total,	22.38	11.05	13.33	7.19

County.	Buckwheat No. 3 and barley.	Screenings.	Total.
Carbon,	101,447	11,601	2,163,896
Columbia,	16,362	.....	936,704
Dauphin,	32,820	995	637,370
Lackawanna,	*2,247,148	44,472	16,901,030
Luzerne,	†1,735,888	18,114	24,648,456
Northumberland,	101,954	17,478	5,238,591
Schuylkill,	416,669	46,879	13,689,857
Sullivan,	.....	226,333	534,004
Susquehanna,	76,310	.....	479,347
Total,	4,728,598	365,872	65,229,255
Percentage of total,	7.25	0.56	100.00

*Includes 423,673 tons of "birdseye," a mixture of buckwheat Nos. 2 and 3.
†Includes 251,597 tons of birdseye.

The amount of coal used in and about the mines in the production of anthracite is very large compared to that used in the bituminous region, and the following table gives the entire production of anthracite for the years 1903 to 1911, including that sold locally and the portion used in and about the mines.

ANTHRACITE PRODUCTION IN 1911 AND 1912, BY COUNTIES, IN LONG TONS.

1911.

County.	Shipped.	Sold to local trade and employes.	Used at mines for steam and heat.	Total.
Carbon,	2,512,675	87,986	346,113	2,946,774
Columbia,	918,828	11,165	135,843	1,065,836
Dauphin,	651,664	51,525	142,316	845,505
Lackawanna,	18,911,259	618,619	1,699,265	21,229,143
Luzerne,	26,393,558	772,728	3,076,588	30,242,874
Northumberland,	5,467,363	110,699	649,657	6,227,719
Schuylkill,	14,427,485	304,026	2,133,081	16,869,592
Sullivan,	590,396	7,203	42,963	640,562
Susquehanna,	550,969	9,809	48,058	608,836
River dredges,	17,400	76,643	604	94,647
Total,	70,441,597	2,050,403	8,279,488	80,771,488

1912.

Carbon,	2,163,896	118,852	285,557	2,568,305
Columbia,	936,704	15,684	127,478	1,079,866
Dauphin,	625,570	21,594	196,677	843,841
Lackawanna,	16,901,030	644,797	1,737,987	19,283,814
Luzerne,	24,645,483	822,840	2,821,556	28,289,879
Northumberland,	5,238,591	116,320	665,529	6,020,440
Schuylkill,	13,676,628	299,802	2,062,077	16,038,507
Sullivan,	534,004	7,597	38,072	579,673
Susquehanna and Wayne,	479,347	9,594	43,867	532,808
River dredges,	28,002	56,824	896	85,722
Total,	65,229,255	2,113,904	7,979,696	75,322,855

BITUMINOUS COAL.

The production of bituminous coal in the state increased from 141,561,257 short tons in 1911 to 161,865,481 tons in 1912, being more than 11,000,000 tons greater than the previous high record of 1910. This increase in production was not confined to any portion of bituminous fields, but the more important counties profited the most. The average price of bituminous coal in 1911 was $1.01, the same as the price in 1908, and the price in 1912 rose to $1.05. This was the highest price paid for bituminous coal in Pennsylvania during a term of thirty years, with the exception of times when strikes occurred, when temporarily the price was higher. The two counties of Fayette and Westmoreland, constituting the Connellsville coke region, naturally had the greatest gains. They likewise had the greatest loss in the amount of coal used for coke in 1911. The output of these two counties in 1912 was 62,956,116 short tons, which was greater than the entire production of Illinois, and 94 per cent. of the entire production of West Virginia. Two other counties in the state, Washington and Allegheny, each increased their production over the preceding year over 1,000,000 tons, while the output of Cambria county increased over 600,000 tons and that of Somerset county over 700,000 tons. Probably never before in the history of coal mining in the state were the mines operated as steadily in the Connellsville coking region, the average number of days active being 275 in Fayette County and 272 in Westmoreland County. The average annual production per man in 1912 was 980 tons, an increase of 121 tons over that of 1911.

While over 22,000 men were idle for an average period of 24 days in April and May, pending the settlement of the wage scale, the total amount of time did not affect the production for the year. The following table gives the production of bituminous coal in 1911 and 1912.

BITUMINOUS COAL PRODUCTION OF PENNSYLVANIA IN 1911 AND 1912, BY COUNTIES, IN SHORT TONS.

1911.

County.	Loaded at mines for shipment.	Sold to local trade and used by employes.	Used at mines for steam and heat.	Made into coke.	Total quantity.	Total value.	Average price per ton.	Average number of days active.	Average number of employes.
Allegheny,	17,011,945	535,160	313,677	3,013	17,863,796	$18,897,024	$1.06	223	22,504
Armstrong,	3,544,645	123,236	125,635	711	3,799,227	3,625,900	.95	240	4,988
Beaver,	137,400	63,446	2,710	.....	203,556	246,515	1.21	265	357
Bedford,	401,165	7,968	13,230	105,807	528,170	546,573	1.03	218	972
Blair,	92,594	167,606	6,786	27,062	294,048	336,451	1.14	179	467
Butler,	913,669	24,799	18,606	.....	957,074	1,006,195	1.05	240	1,342
Cambria,	14,384,596	959,172	367,299	1,253,561	16,928,628	17,499,255	1.03	238	21,900
Center.	1,116,704	20,348	2,711	.....	1,140,263	1,060,519	.93	223	1,712
Clarion.	1,023,959	7,496	25,935	.....	1,057,390	1,022,323	.97	233	1,316
Clearfield.	7,074,270	231,132	211,847	335,177	7,852,426	7,464,258	.95	221	11,635
Clinton,	305,833	7,577	1,233	.....	314,643	388,703	1.24	202	337
Elk,	1,097,515	64,952	20,978	40,411	1,223,856	1,183,395	.97	235	2,013
Fayette,	6,423,003	258,941	499,093	19,429,125	26,610,162	26,693,393	1.00	244	22,381
Huntingdon,	788,619	5,682	11,898	.....	806,199	976,958	1.21	244	1,158
Indiana.	8,186,918	48,843	205,585	339,637	8,780,983	8,303,008	.95	247	10,934
Jefferson.	4,382,608	53,927	113,069	1,001,212	5,550,816	5,225,641	.94	245	5,397
Lawrence,	75,937	3,935	10,279	.....	90,151	109,698	1.22	227	166
Mercer,	767,103	46,339	45,913	.....	859,355	1,015,683	1.18	245	1,333
Somerset,	8,847,001	123,603	206,015	802	9,177,421	9,376,554	1.02	248	9,573
Tioga,	785,187	34,937	10,206	.....	830,330	1,310,187	1.58	162	1,931
Washington,	14,069,442	106,303	369,686	798,251	15,343,772	16,155,763	1.05	214	20,433
Westmoreland,	15,601,722	523,190	674,913	7,297,370	24,102,195	23,437,522	.97	241	24,555
Other counties* and small mines,	59,483	183,550	3,764	.....	246,797	273,434	1.11	102	195
Total,	107,055,318	3,612,732	3,261,068	30,632,139	44,561,257	146,154,952	1.01	233	168,199

*Bradford, Cameron, Greene, Lycoming, and McKean.

1912.

County.	Loaded at mines for shipment.	Sold to local trade and used by employes.	Used at mines for steam and heat.	Made into coke.	Total quantity.	Total value.	Average price per ton.	Average number of days active.	Average number of employes.
Allegheny,	18,087,903	474,116	305,096	150	18,867,265	$20,528,181	$1.09	249	20,756
Armstrong,	3,849,829	126,031	127,329	1,800	4,104,989	4,054,301	.99	216	5,589
Beaver,	160,937	82,912	3,616	.....	247,465	309,304	1.25	261	392
Bedford,	503,985	9,511	16,750	201,231	731,477	795,031	1.09	233	1,067
Blair,	274,795	366	8,666	40,509	324,336	378,511	1.17	209	467
Butler,	969,075	11,284	20,588	.....	1,000,947	1,131,503	1.13	266	1,235
Cambria,	14,563,434	1 314,170	407,268	1,300,258	17,585,130	19,200,298	1.09	241	21,356
Center,	1,275,221	13,412	2,741	.....	1,291,374	1,292,301	1.00	236	1,788
Clarion,	1,158,837	13,249	27,236	.....	1,199,322	1,223,537	1.02	229	1,629
Clearfield,	7,149,021	220,326	234,867	334,123	7,938,337	8,230,763	1.04	233	10,372
Clinton,	332,974	11,005	1,475	.....	345,454	427,192	1.24	248	393
Elk,	1,099,827	11,915	25,344	9,410	1,146,496	1,132,363	.99	245	1,727
Fayette,	7,233,920	317,476	588,535	24,226,636	32,366,567	32,595,749	1.01	275	22,776
Huntingdon,	811,586	6,087	16,126	1,115	834,914	1,025,646	1.23	254	1,112
Indiana,	8,394,140	38,560	317,843	424,384	9,174,927	8,872,019	.97	239	10,902
Jefferson,	4,367,620	59,750	109,723	879,443	5,416,536	5,168,998	.95	244	5,910
Lawrence,	59,906	3,578	12,339	.....	75,823	94,124	1.24	256	127
Mercer,	751,772	51,111	47,345	.....	846,228	1,052,367	1.24	249	1,234
Somerset,	9,549,469	112,170	226,505	.....	9,888,144	11,034,445	1.12	257	9,586
Tioga,	966,170	29,967	11,650	.....	997,787	1,569,289	1.57	218	1,865
Washington,	14,972,227	122,573	367,379	1,182,988	16,645,127	18,012,167	1.08	236	18,714
Westmoreland,	19,899,766	659,743	770,489	9,259,551	30,589,549	30,971,778	1.01	272	25,693
Other counties* and small mines,	55,294	161,583	12,497	17,920	247,294	270,630	1.09	220	234
Total,	116,477,708	3,850,895	3,657,367	37,879,518	161,865,488	$169,370,497	$1.06	252	165,144

*Cameron, Fulton, Greene, Lycoming, and McKean.

The total production of bituminous coal since the year 1840, as nearly as the same can be determined, is shown by the following table.

PRODUCTION OF BITUMINOUS COAL IN PENNSYLVANIA FROM 1840 TO 1912, IN SHORT TONS.

Year.	Quantity.	Year.	Quantity.
1840,	464,826	1878,	15,120,000
1841,	475,000	1879,	16,240,000
1842,	500,000	1880,	18,425,163
1843,	650,000	1881,	22,400,000
1844,	675,000	1882,	24,640,000
1845,	700,000	1883,	26,880,000
1846,	760,000	1884,	28,000,000
1847,	399,840	1885,	26,000,000
1848,	500,000	1886,	27,094,501
1849,	750,000	1887,	31,516,856
1850,	1,000,000	1888,	33,798,727
1851,	1,200,000	1889,	36,174,089
1852,	1,400,000	1890,	42,302,173
1853,	1,500,000	1891,	42,788,490
1854,	1,650,000	1892,	46,694,576
1855,	1,780,000	1893,	44,070,724
1856,	1,850,000	1894,	39,912,463
1857,	2,000,000	1895,	50,217,228
1858,	2,200,000	1896,	49,557,453
1859,	2,400,000	1897,	54,417,974
1860,	2,690,786	1898,	65,165,133
1861,	3,200,000	1899,	74,150,175
1862,	4,000,000	1900,	79,842,326
1863,	5,000,000	1901,	82,305,946
1864,	5,839,000	1902,	98,574,367
1865,	6,350,000	1903,	103,117,178
1866,	6,800,000	1904,	97,938,287
1867,	7,200,000	1905,	113,413,627
1868,	2,500,000	1906,	129,293,206
1869,	6,750,000	1907,	150,143,177
1870,	7,793,518	1908,	117,179,527
1871,	9,040,565	1909,	137,966,791
1872,	11,695,040	1910,	150,521,526
1873,	13,098,828	1911,	144,561,257
1874,	12,320,000	1912,	161,865,483
1875,	11,760,000		
1876,	12,880,000	Total,	2,558,163,842
1877,	14,000,000		

COKE.

The decrease in the production of coke in 1911 in Pennsylvania was 16.7 per cent. in quantity and 22.1 per cent. in value over the output of 1910. The year 1912, however, was in marked contrast with that of 1911, a condition directly due to the renewed activity in the iron and steel industry. The total output of coke in the United States in 1911 was 35,551,489 tons and in 1912 this rose to 43,983,599 tons. The following table gives the total amount of coke produced in the United States from the year 1880 to 1912 in short tons.

QUANTITY OF COKE PRODUCED IN THE UNITED STATES, 1880-1912, IN SHORT TONS.

Year.	Quantity.	Year.	Quantity.
1880,	3,338,300	1897,	13,288,984
1881,	4,113,760	1898,	16,047,209
1882,	4,793,321	1899,	19,663,569
1883,	5,464,721	1900,	20,533,348
1884,	4,873,805	1901,	21,795,883
1885,	5,106,696	1902,	25,401,730
1886,	6,845,369	1903,	25,274,281
1887,	7,611,705	1904,	23,661,106
1888,	8,540,080	1905,	32,231,129
1889,	10,258,022	1906,	36,401,217
1890,	11,508,021	1907,	40,779,564
1891,	10,352,688	1908,	26,033,518
1892,	12,010,829	1909,	39,315,065
1893,	9,477,580	1910,	41,708,310
1894,	9,203,632	1911,	35,551,489
1895,	13,333,714	1912,	43,983,599
1896,	11,788,773		

This increase in the production of coke is very much in line with the increase in the output of bituminous coal. We generally recognize that the output of bituminous coal doubles each ten years. During the period covered by the above table, however, it is to be noted that in the first period of eleven years there was a total production of 72,453,750 tons. During a second period of eleven years the output reached 157,501,209 tons, an increase of 117 per cent.; and during a third period of eleven years, closing with 1912, the output was 370,341,418 tons, exceeding the output of the second period by 135 per cent. The increase in production in Pennsylvania in 1912, over that of 1911, was 5,514,758 tons, or 65 per cent. of the total increase in the United States.

The following tables give the quantity of coke produced in the several states, the total production and the value of the same, together with general data concerning the industry.

QUANTITY OF COKE PRODUCED IN THE UNITED STATES 1908-1912, BY STATES, IN SHORT TONS, WITH INCREASE IN 1912.

State.	1908.	1909.	1910.	1911.	1912.	Increase in quantity of coke produced.	
						1911-12.	Per cent.
Alabama,	2,362,666	3,085,824	3,249,027	2,761,521	2,975,489	213,968	7.75
Colorado,	*982,291	1,251,805	*1,346,211	951,748	972,941	21,193	2.23
Georgia,	39,422	46,385	43,814	37,553	43,158	6,605	14.93
Illinois,	362,182	1,276,956	1,514,504	1,610,212	1,764,944	154,732	9.61
Indiana,	†	†	†	916,411	2,616,339	1,699,928	185.60
Kansas,	2,497	.....	†	†	†	†	†
Kentucky,	†	46,371	53,857	66,099	191,555	125,456	189.80
New Mexico,	274,565	373,967	401,646	381,927	413,906	31,979	8.37
New York,	†	†	652,459	686,172	794,618	108,446	15.80
Ohio,	159,678	222,711	282,315	311,382	388,669	77,287	24.82
Oklahoma,	†	.....	†	.....	.....	.....	.....
Pennsylvania,	16,511,634	24,966,525	26,315,607	21,923,935	27,438,693	5,514,758	25.15
Tennessee,	214,528	261,808	322,756	330,418	370,076	39,658	12.00
Utah,	‡	‡	‡	‡	†	†	†
Virginia,	1,162,051	1,347,478	1,493,655	910,411	967,947	57,536	6.32
Washington,	38,889	42,981	59,337	40,180	49,260	9,080	22.60
West Virginia,	2,637,123	3,943,948	3,803,850	2,291,049	2,465,986	174,937	7.64
Other states,	2,286,092	2,509,306	2,169,772	2,332,471	2,530,018	197,547	8.47
Total,	26,033,518	39,315,065	41,708,810	35,551,489	43,983,599	8,432,110	23.72

*Includes Utah. †Included with other States having less than three producers.
‡Included with Colorado.

TOTAL VALUE, AT THE OVENS, OF THE COKE MADE IN THE UNITED STATES, 1880-1912.

1880,	$6,631,265	1891,	$20,393,216	1902,	$63,339,167
1881,	7,725,175	1892,	23,536,141	1903,	66,498,664
1882,	8,462,167	1893,	16,523,714	1904,	46,144,941
1883,	8,121,607	1894,	12,328,856	1905,	72,476,196
1884,	7,242,878	1895,	19,234,319	1906,	91,608,034
1885,	7,629,118	1896,	21,660,729	1907,	111,539,126
1886,	11,153,366	1897,	22,102,514	1908,	62,483,983
1887,	15,321,116	1898,	25,586,699	1909,	89,965,483
1888,	12,445,963	1899,	34,670,417	1910,	99,742,701
1889,	16,630,301	1900,	47,443,331	1911,	84,130,849
1890,	23,215,302	1901,	44,445,923	1912,	111,736,696

AVERAGE PRICE PER SHORT TON, AT THE OVENS, OF THE COKE MADE IN THE UNITED STATES, 1880-1912.

1880,	$1 99	1891,	$1.57	1902,	$2.49
1881,	1.88	1892,	1.96	1903,	2.63
1882,	1.77	1893,	1.74	1904,	1.95
1883,	1.49	1894,	1.34	1905,	2.25
1884,	1.49	1895,	1.44	1906,	2.62
1885,	1.49	1896,	1.84	1907,	2.74
1886,	1.63	1897,	1.66	1908,	2.40
1887,	2.01	1898,	1.59	1909,	2.29
1888,	1.46	1899,	1.76	1910,	2.39
1889,	1.62	1900,	2.31	1911,	2.37
1890,	2.02	1901,	2.04	1912,	2.54

STATISTICS OF THE MANUFACTURE OF COKE IN THE UNITED STATES IN 1880, 1890, 1900, 1908-1912.

Year.	Establishments.	Ovens.		Coal used (short tons).	Percentage yield of coal in coke.	Coke produced (short tons).	Total value of coke at ovens.	Price of coke at ovens per ton.
		Built.	Building.					
1880, ...	186	12,372	1,159	5,237,741	63.0	3,338,300	$6,631,267	$1.99
1890, ...	253	37,158	1,547	18,005,209	64.0	11,508,021	23,215,302	2.02
1900, ...	396	58,484	5,804	32,113,553	63.9	20,533,348	47,443,331	2.31
1908, ...	551	101,218	2,241	39,440,837	66.0	26,033,518	62,483,983	2.40
1909, ...	579	103,932	2,950	59,354,937	66.2	39,315,065	89,965,483	2.29
1910, ...	578	104,440	2,567	63,038,327	66.1	41,708,810	99,742,701	2.39
1911, ...	570	103,879	2,254	53,278,248	66.7	35,551,489	84,130,849	2.37
1912, ...	559	102,230	2,783	65,577,862	67.1	43,983,599	111,736,696	2.54

MANUFACTURE OF COKE, BY STATES, IN 1911 AND 1912.

1911.

State.	Establishments.	Ovens.		Coal used (short tons).	Percentage yield of coal in coke.	Coke produced (short tons).	Total value of coke.	Price of coke per ton.
		Built.	Building.					
Alabama, ...	44	10,121	280	4,411,298	62.6	2,761,521	$7,593,594	$2.75
Colorado, ...	16	3,606	0	1,810,335	65.0	1,177,023	3,880,710	3.30
Georgia, ...	2	225	0	72,677	51.7	37,553	135,190	3.60
Illinois, ...	4	506	48	2,087,870	77.1	1,610,212	6,390,251	3.97
Kentucky, ...	8	577	300	118,255	55.9	66,099	134,862	2.04
New Mexico, ..	4	1,030	0	620,639	61.5	381,927	1,240,963	3.25
New York, ...	4	556	0	955,067	71.8	686,172	2,883,990	4.20
Ohio, ...	8	496	0	456,222	68.2	311,382	961,904	3.09
Pennsylvania, .	279	54,904	1,271	32,875,655	66.7	21,923,935	43,053,367	1.96
Tennessee, ...	15	2,547	30	628,118	52.6	330,418	797,758	2.41
Utah, ...	2	854	0	†	†	†	†	.....
Virginia, ...	18	5,496	100	1,425,303	63.9	910,411	1,615,609	1.77
Washington, ..	5	235	0	60,201	66.6	40,180	216,262	5.38
West Virginia,.	138	19,876	130	3,754,561	60.4	2,291,049	4,236,845	1.85
Indiana, ...	.....	.....	.....	.....	.....	.....	.....	.....
Kansas, ...	.....	.....	.....	.....	.....	.....	.....	.....
Maryland, ...	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts,	.....	.....	.....	.....	.....	.....	.....	.....
Michigan, ...	23	2,850	95	4,002,047	75.6	3,023,607	10,989,544	3.63
Minnesota, ...	.....	.....	.....	.....	.....	.....	.....	.....
Montana, ...	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey, ..	.....	.....	.....	.....	.....	.....	.....	.....
Oklahoma, ...	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin, ...	.....	.....	.....	.....	.....	.....	.....	.....
Total, ...	570	103,879	2,254	53,278,248	66.7	35,551,489	35,551,489	$2.37

*Includes production of Utah. †Production included with Colorado.

MANUFACTURE OF COKE, BY STATES, IN 1911 AND 1912—Continued.

1912.

State.	Establishments.	Ovens. Built.	Ovens. Building.	Coal used (short tons).	Percentage yield of coal in coke.	Coke produced (short tons).	Total value of coke.	Price of coke per ton.
Alabama,	46	10,208	100	4,585,493	61.9	2,975,489	$8,098,412	$2.72
Colorado,	15	3,588	0	1,473,112	66.0	972,941	3,043,994	3.13
Georgia,	2	251	0	87,300	50.0	43,158	161,842	3.75
Illinois,	6	594	40	2,316,307	76.2	1,764,944	8,069,903	4.57
Indiana,	4	642	169	3,198,874	81.8	2,616,339	12,528,685	4.79
Kentucky,	9	1,049	291	307,162	62.4	191,555	613,734	2.63
Montana,	4	451	3	0	0	0	0	0
New Mexico,	4	1,030	0	679,209	60.9	413,906	1,356,946	3.28
New York,	4	555	0	1,095,198	72.6	794,618	3,203,133	4.03
Ohio,	7	471	119	561,426	69.2	388,669	1,365,905	3 5
Oklahoma,	2	260	0	0	0	0	0	0
Pennsylvania,	277	53,756	1,887	41,268,532	66.5	27,438,693	56,267,838	2.05
Tennessee,	15	2,584	0	685,861	54.0	370,076	951,853	2.57
Virginia,	18	5,408	0	1,555,969	62.2	867,947	1,815,975	1.88
Washington,	6	313	0	78,693	62.6	49,260	279,105	5.67
West Virginia,	129	19,064	0	4,061,702	60.7	2,465,986	4,692,393	1.90
Kansas,	.....	.....	.....	.....	.....	.....	.....	.....
Maryland,	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts,	.....	.....	.....	.....	.....	.....	.....	.....
Michigan,	11	2,006	174	3,623,019	69.8	2,530,018	9,386,978	3.71
Minnesota,	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	.....	.....	.....	.....	.....	.....	.....	.....
Utah,	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin,	.....	.....	.....	.....	.....	.....	.....	.....
Total,	559	102,230	2,783	65,577,862	67.1	43,983,599	111,736,696	$2.54

RANK OF THE STATES IN PRODUCTION OF COKE, 1908-1912.

State.	1908.	1909.	1910.	1911.	1912.
Pennsylvania,	1	1	1	1	1
Alabama,	3	3	3	2	2
Indiana,	24	22	17	6	3
West Virginia,	2	2	2	3	4
Illinois,	9	5	4	4	5
Colorado,	5	6	6	5	6
Virginia,	4	4	5	7	7
New York,	6	7	7	8	8
Wisconsin,	8	8	8	9	9
Massachusetts,	7	9	9	10	10
Michigan,	13	11	11	12	11
New Mexico,	10	10	10	11	12
Ohio,	15	15	14	15	13
Tennessee,	14	13	13	14	14
Utah,	16	16	16	17	15
Maryland,	11	12	12	13	16
New Jersey,	12	14	15	16	17
Kentucky,	20	19	20	19	18
Minnesota,	17	17	18	18	19
Washington,	19	20	19	20	20
Georgia,	18	18	21	21	21
Kansas,	23	.....	24	22	22
Montana,	21	21	22	.....	.....
Oklahoma,	22	.....	23	.....	.....

TOTAL VALUE, AT THE OVENS, OF THE COKE MADE IN THE UNITED STATES, 1908-1912, BY STATES, WITH INCREASE IN 1912.

State.	1908	1909	1910	1911	1912	Increase in value of coke produced. 1911-12	Increase in value of coke produced. Percentage.
Alabama,	$7,169,901	$8,068,267	$9,165,821	$7,593,594	$8,098,412	$504,818	6.65
Colorado,	*3,238,888	*4,135,931	*4,273,579	2,903,811	3,043,994	140,183	4.83
Georgia,	137,524	159,334	173,049	135,190	161,842	26,652	19.71
Illinois,	1,538,952	5,361,510	6,712,550	6,390,257	8,069,903	1,679,652	26.28
Indiana,	†	†	†	3,598,195	12,528,685	8,930,490	248.19
Kansas,	8,011	.....	†	†	†	†	†
Kentucky,	†	101,257	120,554	134,862	513,734	378,872	280.93
New Mexico,	826,780	1,099,694	1,306,136	1,240,963	1,356,946	115,983	9.35
New York,	†	†	2,635,873	2,883,990	3,203,133	319,143	11.07
Ohio,	491,982	683,155	911,987	961,904	1,365,905	404,001	42.00
Oklahoma,	†	.....	†	.....	.....	.....	.....
Pennsylvania,	32,569,621	50,377,635	55,254,599	43,053,367	56,267,838	13,214,471	30.69
Tennessee,	561,789	667,723	959,104	797,758	951,853	154,095	19.32
Utah,	‡	‡	‡	‡	†	†	†
Virginia,	2,121,980	2,115,769	2,731,348	1,615,609	1,815,975	200,366	12.40
Washington,	213,138	240,604	317,540	216,262	279,105	62,843	29.06
West Virginia	5,267,654	7,525,922	7,354,039	4,236,845	4,692,363	455,518	10.75
Other states,	8,338,303	9,129,282	7,796,522	8,368,242	9,386,978	1,018,730	12.17
Total,	$62,483,983	$89,965,183	$99,742,701	$84,130,849	$111,736,696	$27,605,847	32.81

*Includes value of Utah coke. †Included in other states having less than three producers.
‡Included with Colorado.

QUANTITY OF COAL USED IN THE MANUFACTURE OF COKE IN THE UNITED STATES EACH FIFTH YEAR, 1880-1912.

	Short Tons.		Short Tons.
1880,	5,237,741	1905,	49,530,677
1885,	8,071,126	1910,	63,088,327
1890,	18,005,209	1911,	53,278,248
1895,	20,818,323	1912,	65,577,862
1900,	32,113,543		

QUANTITY OF COAL USED IN THE MANUFACTURE OF COKE IN THE UNITED STATES, 1908-1912, BY STATES, IN SHORT TONS.

State.	1908	1909	1910	1911	1912
Alabama,	3,875,791	5,080,761	5,272,322	4,411,298	4,585,498
Colorado,	*1,546,041	*1,984,985	*2,069,266	*1,810,335	1,473,112
Georgia,	71,152	86,290	80,019	72,677	87,300
Illinois,	503,289	1,682,122	1,972,935	2,087,870	2,316,307
Indiana,	†	†	†	†	3,198,874
Kansas,	3,790	.....	†	†	†
Kentucky,	†	89,083	104,103	118,255	307,162
Montana,	†	†	†	.....	.....
New Mexico,	454,873	694,390	651,494	620,639	679,209
New York,	†	†	910,293	955,067	1,095,198
Ohio,	237,448	310,735	413,059	456,222	561,426
Oklahoma,	†	.....	†	.....	.....
Pennsylvania,	23,215,964	36,983,568	39,455,785	32,875,655	41,268,532
Tennessee,	395,936	493,283	597,658	628,118	685,861
Utah,	†	†	‡	‡	†
Virginia,	1,785,281	2,060,518	2,310,742	1,425,303	1,555,969
Washington,	68,069	69,508	91,223	60,201	78,693
West Virginia,	4,127,739	6,361,759	6,220,234	3,754,761	4,061,702
Other states,	3,155,106	3,427,732	2,930,174	4,002,047	3,623,019
Total,	39,446,837	59,354,937	63,088,327	53,278,248	65,577,862

*Includes coal coked in Utah. †Included in other states having less than three producers.
‡Included with Colorado.

QUANTITY AND VALUE OF COAL USED IN THE MANUFACTURE OF COKE IN THE UNITED STATES IN 1911 AND 1912, AND QUANTITY AND VALUE OF SAME PER TON OF COKE, BY STATES.

1911.

State.	Coal used (short tons).	Total value of coal.	Value of coal per ton.	Quantity of coal per ton of coke (short tons).	Value of coal to a ton of coke.
Alabama,	4,411,298	$5,640,509	$1.28	1.597	$2.044
Colorado,*	1,810,335	2,192,882	1.21	1.538	1.861
Georgia,	72,677	113,403	1.55	1.935	2.999
Illinois,	2,087,870	5,774,922	2.77	1.291	3.567
Kentucky,	118,255	61,658	.52	1.789	.930
New Mexico,	620,639	960,481	1.55	1.625	2.519
New York,	955,067	2,258,551	2.37	1.392	3.299
Ohio,	456,222	853,655	1.87	1.465	2.740
Pennsylvania,	32,875,655	32,923,400	1.00	1.500	1.500
Tennessee,	628,118	636,058	1.01	1.901	1.920
Virginia,	1,425,302	1,132,374	.79	1.566	1.237
Washington,	60,201	127,959	2.13	1.498	3.191
West Virginia,	3,754,561	3,037,531	.81	1.639	1.328
Other states,†	4,002,047	10,218,059	2.55	1.324	3.376
Total,	53,278,248	$65,931,502	$1.24	1.499	$1.859

1912.

Alabama,	4,585,493	$6,177,876	$1.35	1.541	$2.080
Colorado,	1,473,112	2,307,660	1.57	1.514	2.377
Georgia,	87,300	130,950	1.50	2.023	3.035
Illinois,	2,316,307	6,568,003	2.84	1.312	3.726
Indiana,	3,198,874	9,689,756	3.03	1.223	3.706
Kentucky,	307,162	254,205	.83	1.600	1.328
New Mexico,	679,209	1,098,332	1.62	1.641	2.658
New York,	1,095,198	2,648,931	2.42	1.378	3.335
Ohio,	561,426	1,085,040	1.93	1.444	2.787
Pennsylvania,	41,263,532	43,228,919	1.05	1.504	1.579
Tennessee,	685,861	672,075	.98	1.762	1.727
Virginia,	1,555,969	1,241,995	.80	1.607	1.286
Washington,	78,693	166,227	2.11	1.598	3.372
West Virginia,	4,061,702	3,403,589	.84	1.647	1.383
Other states,‡	3,623,019	8,245,354	2.28	1.432	3.265
Total,	65,577,862	$86,918,962	$1.33	1.491	$1.983

*Includes Utah.
†Includes Indiana, Kansas, Maryland, Massachusetts, Michigan, Minnesota, New Jersey and Wisconsin.
‡Includes Kansas, Maryland, Massachusetts, Michigan, Minnesota, New Jersey, Utah and Wisconsin.

PERCENTAGE YIELD OF COAL IN COKE, 1880-1912.

1880,	63.0	1906,	65.3
1890,	64.0	1907,	65.8
1900,	63.9	1908,	66.0
1901,	63.7	1909,	66.2
1902,	64.1	1910,	66.1
1903,	64.1	1911,	66.7
1904,	64.8	1912,	67.1
1905,	65.1		

PERCENTAGE YIELD OF COAL IN COKE, 1908-1912, BY STATES.

States.	1908	1909	1910	1911	1912
Alabama,	61.0	60.7	61.6	62.6	64.9
Colorado,	64.2	64.9	66.6	66.6	66.0
Georgia,	55.2	53.8	54.8	51.7	50.0
Illinois,	72.0	75.9	76.8	77.1	76.2
Indiana,	70.0	44.4	78.3	80.6	81.8
Kansas,	65.9	.....	75.2	70.0	70.0
Kentucky,	50.0	52.0	51.7	55.9	62.4
Maryland,	72.1	67.9	65.6	66.2	65.8
Massachusetts,	76.4	77.7	77.3	77.4	75.5
Michigan,	74.5	74.1	75.7	74.2	75.4
Minnesota,	66.4	67.7	68.0	67.6	69.6
Montana,	58.3	44.7	44.7	.....	.....
New Jersey,	72.3	77.7	76.1	76.2	78.4
New Mexico,	60.4	53.9	61.6	61.5	60.9
New York,	71.3	72.0	71.7	71.8	72.6
Ohio,	67.2	65.4	68.3	68.2	69.2
Oklahoma,	46.0	.....	45.0	.....	.....
Pennsylvania,	66.8	67.3	66.7	66.7	66.5
Tennessee,	54.2	53.1	54.0	52.6	54.0
Utah,	59.6	53.7	54.9	59.0	56.8
Virginia,	65.1	65.4	64.6	63.9	62.2
Washington,	57.1	61.7	63.0	66.6	62.6
West Virginia,	63.9	62.0	61.1	60.4	60.7
Wisconsin,	74.5	76.1	77.4	74.9	69.6
Total average,	66.0	66.2	66.1	66.7	67.1

The production of coke in Pennsylvania is almost wholly from beehive ovens, and it is to be noted that the average price of beehive coke throughout the United States has not fallen below $2.00 per ton during the last five years, and indeed the average price of coke, including retort coke, has not fallen below $2.25 since the year 1904.

PRODUCTION OF BY-PRODUCT COKE, COMPARED WITH THAT OF BEEHIVE COKE, WITH PERCENTAGE OF QUANTITY AND VALUE TO THE TOTAL, 1893-1912.

Year.	By-product Coke.				Beehive Coke.				Total.	
	Quantity—Short tons.	Percentage to total.	Value.	Percentage to total.	Quantity—Short tons.	Percentage to total.	Value.	Percentage to total.	Quantity—Short tons.	Value.
1893	12,850	0.01	.....	.....	9,464,730	99.99	.....	.....	9,477,580	$16,523,714
1901	1,179,900	5.41	$2,894,077	6.51	20,615,983	94.59	$41,551,846	93.49	21,795,883	44,445,923
1907	5,607,899	13.75	21,665,157	19.42	21,832,292	83.86	48,018,554	76.85	26,033,718	62,483,983
1908	4,201,226	16.14	14,465,429	23.15	35,171,665	86.25	89,873,969	80.58	40,779,564	111,539,126
1909	6,254,644	15.91	20,434,689	22.71	33,060,421	84.09	69,530,794	77.29	39,315,065	89,965,483
1910	7,138,734	17.12	24,793,016	24.86	34,570,076	82.88	74,949,685	75.14	41,708,810	99,742,701
1911	7,847,845	22.07	27,297,897	32.45	27,703,644	77.93	56,832,952	67.55	35,551,489	84,130,849
1912	11,115,164	25.27	42,632,930	38.15	32,868,435	74.73	69,103,766	61.85	43,983,599	111,736,696

Pennsylvania produces almost two-thirds of the total output of coke in the United States. In 1912 the Connellsville and lower Connellsville districts produced 48 per cent. of the whole. The quantity of coke produced in 1912 in Pennsylvania was 27,438,693 short tons as compared with 21,923,935 tons in 1911, an increase of 25.15 per cent. The value of the coke produced rose from $43,053,367 in 1911 to $56,267,838 in 1912, or 30.69 per cent. The average price per ton in 1911 was $1.96 and in 1912, $2.05. The output in 1912 was the greatest on record, exceeding the previous high mark of 1907 by almost 1,000,000 tons, but falling below in value by over $11,000,000. The average price per ton for coke in 1907 was $2.55.

The following table gives the figure of production of Pennsylvania coke for the years 1880-1890-1900, and the years 1908 to 1912.

STATISTICS OF THE MANUFACTURE OF COKE IN PENNSYLVANIA, 1880-1912.

Year.	Establishments.	Ovens.		Coal used (short tons).	Yield of coal in coke (per cent.)	Coke produced (short tons).	Total value of coke at ovens.	Value of coke at ovens per ton.
		Built.	Building.					
1880, ...	124	9,501	836	4,347,558	65.0	2,821,384	$5,255,040	$1.86
1890, ...	106	23,430	74	13,046,443	65.6	8,560,245	16,333,674	1.91
1900, ...	177	32,548	2,310	20,239,966	66.0	13,357,295	29,692,258	2.22
1908, ...	252	52,606	1,720	23,215,964	66.8	15,511,634	32,569,621	2.10
1909, ...	283	54,506	2,072	36,983,568	67.3	24,905,525	50,377,035	2.02
1910, ...	288	55,656	1,334	39,435,785	66.7	26,315,007	55,254,599	2.10
1911, ...	279	54,908	1,271	32,875,655	66.7	21,923,935	43,053,367	1.96
1912, ...	277	*53,756	†1,887	41,268,532	66.5	27,438,693	56,267,838	2.05

*Includes 932 United-Otto, 360 Semet-Solvay, 150 Didier, 2,961 rectangular, 400 Belgian, 420 longitudinal and 11 Ramsey ovens.
†Includes 1,083 rectangular and 150 Didier ovens.

Most of the coal used in Pennsylvania for coke is unwashed run-of-mine coal, and of the total quantity of 41,268,532 short tons of coal used for coking in 1912, 35,344,633 tons were of this grade and character. The washed coal consisted of 2,493,661 short tons of run-of-mine coal and 2,331,848 tons of slack.

CHARACTER OF COAL USED IN MANUFACTURE OF COKE IN PENNSYLVANIA.

Year.	Run-of-mine.		Slack.		
	Unwashed.	Washed.	Unwashed.	Washed.	Total.
1890,	11,788,625	303,591	630,195	323,732	13,046,143
1895,	13,618,376	34,728	440,869	117,594	14,211,567
1900,	17,692,623	647,045	1,300,796	599,502	20,239,966
1905,	26,148,696	1,335,631	2,436,621	1,109,397	31,030,345
1908,	18,691,973	1,718,944	1,062,478	1,743,469	23,215,964
1909,	31,712,482	2,278,927	1,016,576	1,975,583	36,983,568
1910,	32,688,029	2,372,115	1,275,348	3,120,293	39,455,785
1911,	27,601,050	1,958,360	1,029,149	2,287,096	32,875,655
1912,	35,344,633	2,493,661	1,698,392	2,331,846	41,268,532

CHARACTER OF COAL USED IN THE MANUFACTURE OF COKE, BY STATES, IN 1911 AND 1912, IN SHORT TONS.

State.	Run-of-mine.		Slack.			Total.		
	Unwashed.	Washed.	Unwashed.	Washed.	Unwashed.	Percentage.	Washed.	Percentage.
1911.								
Alabama,	693,135	1,295,109	2,937	2,420,117	696,072	15.8	3,715,226	84.2
Colorado,	.....	1,025,031	428,971	356,333	428,971	23.7	1,381,364	76.3
Georgia,	.....	.....	.....	72,677	.....	.....	72,677	100.0
Illinois,	2,054,639	33,231	.....	.....	2,054,639	98.4	33,231	1.6
Kentucky,	33,353	.....	10,908	73,994	41,261	37.4	73,994	62.6
New Mexico,	.....	.....	.....	620,639	.....	.....	620,639	100.0
New York,	760,114	128,550	25,591	40,809	785,708	82.3	169,359	17.7
Ohio,	417,101	16,574	5,504	17,043	422,605	92.6	33,617	7.4
Pennsylvania,	27,601,050	1,958,360	1,029,149	2,287,096	28,630,199	87.1	4,245,456	12.9
Tennessee,	.....	283,203	.....	344,915	.....	.....	628,118	100.0
Virginia,	675,497	.....	749,806	.....	1,425,303	100.0	.....	.....
Washington,	.....	20,154	.....	40,047	.....	.....	60,201	100.0
West Virginia,	925,460	158,308	2,408,299	262,194	3,333,759	88.8	420,502	11.2
Indiana, Kansas, Maryland, Massachusetts, Michigan, Minnesota, Montana, New Jersey, Oklahoma, Wisconsin,	3,202,526	.....	799,521	.....	4,002,047	100.0	.....	.....
Total,	36,362,875	4,918,520	5,460,689	6,536,164	41,823,564	78.5	11,454,684	21.5
1912.								
Alabama,	747,305	896,421	18,793	2,922,979	766,098	16.7	3,819,400	83.3
Colorado,	680	1,061,917	43,310	367,205	43,990	3.0	1,429,122	97.0
Georgia,	.....	.....	.....	87,300	.....	.....	87,300	100.0
Illinois,	2,279,974	36,333	.....	.....	2,279,974	98.4	36,333	1.6
Indiana,	3,167,766	108	31,000	.....	3,198,766	100.0	108	.....
Kentucky,	172,020	.....	63,880	71,262	235,900	76.8	71,262	23.2
New Mexico,	.....	.....	.....	679,209	.....	.....	679,209	100.0
New York,	849,029	200,554	43,360	2,255	892,389	81.5	202,809	18.5
Ohio,	506,883	23,541	15,598	15,404	522,481	93.1	38,945	6.9
Pennsylvania,	35,344,633	2,493,661	1,098,392	2,331,846	36,443,025	88.3	4,825,507	11.7
Tennessee,	.....	189,887	86,678	409,296	86,678	12.6	599,183	87.4
Virginia,	793,019	.....	762,950	.....	1,555,969	100.0	.....	.....
Washington,	.....	76,611	.....	2,082	.....	.....	78,693	100.0
West Virginia,	1,146,620	143,309	2,432,229	338,544	3,579,849	88.1	481,853	11.9
Kansas, Maryland, Massachusetts, Michigan, Minnesota, New Jersey, Utah, Wisconsin,	2,552,043	.....	1,070,976	.....	3,623,019	100.0	.....	.....
Total,	47,559,972	5,122,342	5,668,166	7,227,382	53,228,138	81.1	12,349,724	18.9

*Includes Utah.

It has been customary to consider the production of coke in Pennsylvania according to well defined districts. These districts are based to some extent on geographical location, and also upon the quality of coal mined, and the coke made. The following brief statement concerning the coke districts of Pennsylvania is taken from the report by Mr. Parker for 1912.

"In previous chapters of this series of reports it has been customary to consider the production of coke in Pennsylvania according to certain well-defined districts. These divisions are based to some extent upon geographic boundaries, but also upon the quality of the coal mined and the coke produced. Each district has been more fully described in some of the preceding volumes, but the following brief statement regarding the territory included in the different coking districts is repeated here for the sake of convenience.

The Allegheny Mountain district includes the ovens along the line of the Pennsylvania Railroad from Gallitzin eastward over the crest of the Alleghenies to a point beyond Altoona. The Allegheny Valley district formerly included the coke works of Armstrong and Butler counties and one of those in Clarion County, the other ovens in the latter county being included in the Reynoldsville-Walston district. All but two of the Allegheny Valley plants have been abandoned, and the production previous to 1908 has been included in that of the Pittsburgh district. During 1911 but one of these plants was in operation. What was previously known as the Beaver district included the ovens in Beaver and Mercer counties, but all the ovens in Beaver County have been abandoned, those formerly operated by the Semet-Solvay Co. in Mercer County have been abandoned, and the operations of the one establishment of United-Otto ovens at South Sharon are now also included in the Pittsburgh district. The Blossburg and the Broadtop districts embrace the Blossburg and the Broadtop coal fields. The ovens of the Clearfield-Center district are chiefly in the two counties from which it derives its name. The Connellsville district is the well-known region of western Pennsylvania in Westmoreland and Fayette counties, extending from just south of Latrobe to Fairchance. The Lower Connellsville region is entirely in Fayette County and southwest of the Connellsville Basin proper, from which it is separated by the Greensburg anticline. It embraces the recent developments in the vicinity of Uniontown and is now the second producing district of the State. The Greensburg, Irwin, Pittsburgh, and Reynoldsville-Walston districts include the ovens near the towns which have given the names to these districts. The Upper Connellsville district, sometimes called the Latrobe district, is near the town of Latrobe. The Semet-Solvay ovens at Chester, Steelton, and Lebanon, the 150 Didier ovens at South Bethlehem, and the United-Otto ovens at Lebanon are in what has been designated as the

Lebanon-Schuylkill district. The production of the districts having less than three producers is combined.

The following table gives the figures of production of coke in the several districts as above discribed for the years 1911 and 1912."

COKE PRODUCTION IN PENNSYLVANIA IN 1911 AND 1912, BY DISTRICTS.

District.	Establishments.	Ovens.		Coal used (short tons).	Yield of coal in coke (per cent.)	Coke produced (short tons).	Total value of coke at ovens.	Value of coke per ton.
		Built.	Building.					
1911.								
Allegheny Mountains,	25	2,475	.....	1,182,516	69.9	826,726	$2,037,953	$2.47
Connellsville,	112	23,879	227	14,420,328	66.3	9,565,013	18,471,506	1.93
Greensburg,	7	2,040	.....	1,142,361	65.4	747,654	1,451,130	1.94
Lower Connellsville,	71	14,857	654	10,771,495	68.3	7,354,736	12,998,192	1.77
Pittsburgh,	12	3,737	.....	2,722,422	62.4	1,449,934	3,228,508	2.23
Reynoldsville-Walston,	10	2,881	.....	1,427,856	57.3	818,942	1,839,344	2.25
Upper Connellsville,	21	2,319	60	514,486	64.4	330,886	576,860	1.74
Allegheny Valley, Broadtop, Clearfield-Center, Irwin, Lebanon and Schuylkill Valley,	21	2,216	330	1,094,451	75.8	830,044	2,449,374	2.95
Total,	279	54,904	1,271	32,875,655	66.7	21,923,935	$43,053,367	1.96
1912.								
Allegheny Mountains,	25	a2,483	.....	1,252,141	69.6	870,951	$2,384,725	$2.74
Allegheny Valley,	2	52	.....	.....	.....	.....	.....	.....
Connellsville,	109	b22,219	148	17,772,202	66.5	11,814,588	22,463,602	1.90
Lower Connellsville,	74	c15,525	d422	13,456,074	67.1	9,023,371	17,098,420	1.90
Greensburg,	7	e2,040	.....	1,358,845	65.3	894,271	1,883,068	2.11
Irwin,	2	289	.....	.....	.....	.....	.....	.....
Pittsburgh,	11	f3,724	g796	3,560,293	64.6	2,301,362	5,813,575	2.53
Reynoldsville-Walston,	10	h2,881	1200	1,211,655	57.9	701,667	1,586,344	2.26
Upper Connellsville,	22	j2,749	k143	1,120,295	68.1	762,700	1,564,457	2.05
Lebanon and Schuylkill Valley,	5	1628	m150	1,215,146	70.9	861,072	2,917,244	3.39
Broadtop, Clearfield-Center,	10	1,166	28	321,876	64.8	208,711	555,903	2.66
Total,	277	53,756	1,887	41,268,522	66.5	27,438,693	$56,267,338	2.05

a Includes 372 United-Otto ovens.
b Includes 1,120 rectangular and 110 Semet-Solvay ovens.
c Includes 1,702 rectangular and 360 longitudinal ovens.
d Includes 314 rectangular ovens.
e Includes 100 Belgian ovens.
f Includes 332 United-Otto, 300 Belgian, and 10 rectangular ovens.
g Includes 476 rectangular ovens.
h Includes 11 Ramsay ovens.
i Rectangular ovens.
j Includes 189 rectangular ovens.
k Includes 93 rectangular ovens.
l Includes 270 Semet-Solvay, 228 United-Otto, and 150 Didier ovens.
m Didier ovens.

CONNELLSVILLE DISTRICT.

Lying entirely in the two counties of Fayette and Westmoreland, this continues to be the largest coke producing district in the world. It would seem, both from the history of the past few years of the Connellsville district, and the amount of coal available in the district, there will be little, if any, expansion of the industry in the Connellsville region. In the year 1912 there were 18,151 active ovens in the district, producing an average of 651 tons per oven. The average price fell from $1.93 to $1.90, while the general average for coke in Pennsylvania was $2.05 in 1912. This apparent inconsistency is due to the fact that the coke made in the Connellsville region is from ovens located in the immediate vicinity of the mines, and the greater average price is due to that coke produced in retort ovens in regions outside of the bituminous coal fields, and where the freight on the coal must be added. In the Connellsville region there are only 110 by-product ovens out of the total of 22,219.

There is no coal field in the United States where the available supply of mineable coal is better known than in this district, and the future of coal mining and of the coke industry can be most closely computed. We must expect a sharp decline in the output from this district in the near future.

In the following table is given the statistics of production in the Connellsville district in 1880-1890-1900, and from 1908-1912.

STATISTICS OF THE MANUFACTURE OF COKE IN THE CONNELLSVILLE REGION, PENNSYLVANIA, 1880-1912.

Year.	Establishments.	Ovens.		Coal used (short tons).	Yield of coal in coke (per cent.)	Coke produced (short tons).	Total value of coke at ovens.	Value of coke at ovens per ton.
		Built.	Building.					
1880,	67	7,211	731	3,367,856	65.5	2,205,946	$3,948,643	$1.79
1890,	28	15,865	20	9,748,449	66.3	6,464,156	11,537,370	1.94
1900,	98	20,381	686	14,946,659	67.0	10,020,907	22,383,432	2.23
1908,	104	24,071	118	10,238,665	67.2	6,880,951	14,025,422	2.04
1909,	117	24,422	370	17,581,899	66.9	11,769,758	23,379,149	1.99
1910,	118	24,481	206	17,205,615	66.6	11,459,601	23,121,556	2.02
1911,	112	23,879	227	14,420,328	66.3	9,565,013	18,471,506	1.93
1912,	109	a22,219	148	17,772,202	66.5	11,814,583	22,463,602	1.90

aIncludes 110 Semet-Solvay by-product and 1,120 rectangular ovens.

The monthly shipment from Connellsville region, including the Lower Connellsville region, from 1908 to 1912 as compiled by the Connellsville Courier, were as follows:

MONTHLY SHIPMENTS OF COKE FROM THE CONNELLSVILLE AND LOWER CONNELLSVILLE REGIONS, 1908-1912, IN SHORT TONS.

Month.	1908.	1909.	1910.	1911.	1912.
January.	742,096	1,205,650	1,952,406	1,194,047	1,675,198
February,	810,436	1,143,487	1,787,164	1,302,098	1,583,567
March,	841,059	1,185,814	1,922,575	1,621,301	1,750,944
April,	772,915	1,144,751	1,754,654	1,419,369	1,710,417
May,	759,813	1,235,044	1,527,515	1,343,879	1,778,860
June,	772,367	1,429,289	1,544,964	1,299,295	1,621,004
July,	856,843	1,605,937	1,446,294	1,257,820	1,565,126
August,	952,492	1,641,287	1,464,060	1,355,774	1,690,681
September,	975,606	1,704,919	1,390,140	1,394,752	1,553,246
October,	1,030,552	1,821,444	1,450,717	1,424,232	1,793,432
November,	995,807	1,835,745	1,252,797	1,385,627	1,736,938
December,	1,190,036	1,832,465	1,196,436	1,335,974	1,672,862
Total,	10,700,022	17,785,832	18,689,722	16,334,168	20,032,275

The following table gives the total shipments of coke from the Connellsville and Lower Connellsville regions during the years 1888 to 1912.

TOTAL AND DAILY AVERAGE SHIPMENTS, IN CARS, 1888-1912.

Year.	Daily Average.	Total. Cars.	Year.	Daily Average.	Total. Cars.	Year.	Daily Average.	Total. Cars.
1888, ...	905	282,441	1897, ...	1,181	367,383	1906, ...	2,385	745,274
1889, ...	1,046	326,220	1898, ...	1,415	441,249	1907, ...	2,210	691,757
1890, ...	1,147	355,070	1899, ...	1,676	523,203	1908, ...	1,173	368,222
1891, ...	884	274,000	1900, ...	1,619	504,410	1909, ...	1,920	600,979
1892, ...	1,106	347,012	1901, ...	1,857	581,051	1910, ...	1,923	598,706
1893, ...	874	270,930	1902, ...	1,986	624,198	1911, ...	1,570	488,672
1894, ...	900	281,677	1903, ...	1,782	558,738	1912, ...	1,911	595,336
1895, ...	1,410	441,243	1904, ...	1,623	510,759			
1896, ...	920	289,137	1905, ...	1,886	688,328			

The average monthly shipments and prices of coke from the Connellsville and Lower Connellsville districts by months, during the years 1911 and 1912 were as follows.

SHIPMENTS OF COKE FROM THE CONNELLSVILLE REGION, INCLUDING THE LOWER CONNELLSVILLE DISTRICT, IN 1911 AND 1912, BY MONTHS.

Month.	1911.			1912.		
	Cars.	Daily car average.	Short tons.	Cars.	Daily car average.	Short tons.
January,	36,511	1,404	1,194,047	46,537	1,723	1,546,892
February,	39,726	1,655	1,302,098	47,212	1,888	1,560,182
March,	49,581	1,837	1,621,301	52,015	2,000	1,747,959
April,	42,700	1,708	1,419,369	50,862	1,956	1,697,734
May,	39,809	1,474	1,343,879	53,142	1,968	1,776,415
June,	38,322	1,474	1,299,295	48,959	1,958	1,635,824
July,	37,129	1,424	1,257,820	46,723	1,797	1,564,377
August,	40,364	1,491	1,355,774	50,244	1,861	1,704,307
September,	41,389	1,592	1,394,752	45,753	1,830	1,555,483
October,	42,582	1,638	1,424,232	52,443	1,940	1,782,302
November,	41,288	1,592	1,385,627	51,261	1,971	1,736,888
December,	39,371	1,651	1,335,974	50,185	2,007	1,692,510
Total,	488,672	1,570	16,334,168	595,336	1,911	20,000,873

PRICES OF CONNELLSVILLE FURNACE AND FOUNDRY COKE, 1909-1912, BY MONTHS.

Month.	Furnace.					
	1909.	1910.	1911.		1912.	
			Spot.	Contract.	Spot.	Contract.
January,	$1.50 to $2.50	$2.50 to $2.75	$1.40 to $1.55	$1.70 to $2.00	$1 75 to $1.85	$1.65 to $1.70
February,	1.50 to 1.65	1.75 to 2.60	1.45 to 1.55	1.70 to 1.75	1.75 to 1.80	1.75 to 1.80
March,	1.55 to 2.00	2.10 to 2.60	1.50 to 1.65	1.70 to 2.00	1.85 to 2.25	1.75 to 1.80
April,	1.60 to 1.85	1.75 to 2.15	1.60 to 1.65	1.80 to 2.00	2.10 to 2.60	2.15 to 2.25
May ,	1.50 to 1.90	1.65 to 2.00	1.50 to 1.65	1.75 to 1.85	2.10 to 2.50	2.25 to 2.35
June,	1.50 to 1.75	1.65 to 1.85	1.40 to 1.50	1.55 to 1.85	1.90 to 2.10	2.25 to 2.35
July,	1.60 to 1.80	1.60 to 1.85	1.45 to 1 55	1.55 to 1.75	2.15 to 2.25	2.25
August,	1.65 to 2.00	1.60 to 1.85	1.45 to 1.55	1.60 to 1.65	2.15 to 2.25	2.25
September,	2.00 to 3.00	1.60 to 1.80	1.50 to 1.55	1.60 to 1.70	2.15 to 2.50	2.25 to 2.50
October,	2.75 to 3.00	1.55 to 1.75	1.50 to 1.55	1.55 to 1.70	2.65 to 4.00	2.50 to 3.00
November,	2.75 to 2.90	1.45 to 1.75	1.50 to 1.55	1.50 to 1.75	2.85 to 4.00	3.00 to 3.25
December,	2.60 to 2.90	1.40 to 1.80	1.50 to 1.80	1.60 to 1.75	4.00	3.25
	Foundry.					
January,	$2.00 to $2.50	$2.85 to $3.25	$1.90 to $2.50	$2.25 to $2.50	$1.90 to $2.00	$2.10 to $2.15
February,	1.85 to 2.25	2.50 to 3.00	2.10 to 2.50	2.25 to 2.50	2.00 to 2.25	2.10 to 2.25
March,	1.85 to 2.25	2.60 to 3.15	2.00 to 2.50	2.25 to 2.40	2.25 to 2.75	2.25 to 2.50
April,	1.75 to 2.40	2.50 to 3.00	2.00 to 2.00	2.25 to 2.40	2.50 to 2.75	2.50 to 2.75
May,	1.80 to 2.35	2.15 to 2.75	1.75 to 2.00	2.10 to 2.40	2.50 to 2.75	2.40 to 2.65
June,	1.80 to 2.50	2.15 to 2.50	1.75 to 2.00	2.00 to 2.40	2.40	2.40 to 2.60
July,	1.80 to 2.50	2.15 to 2.50	1.85 to 2.00	2.10 to 2.40	2.40	2.40 to 2.60
August,	1.70 to 2.50	2.15 to 2.50	1.95 to 2.00	2.00 to 2.50	2.40	2.50
September,	2.25 to 3.25	2.10 to 2.50	1.85 to 2.00	2.10 to 2.40	2.40 to 2.75	2.50 to 2.75
October,	2.75 to 3.50	2.15 to 2.50	1.85 to 2.00	2.10 to 2.40	3.00 to 4.25	3.00 to 3.75
November,	3.00 to 3.50	2.00 to 2.50	1.85 to 2.00	2.10 to 2.40	4.25	3.75
Decemeber,	3.25 to 3.50	1.90 to 2.50	1.90 to 2.00	2.10 to 2.25	4.25 to 4.50	3.75 to 4.00

LOWER CONNELLSVILLE COKE DISTRICT.

The Lower Connellsville coke district is the second in importance of the coke producing districts of the United States. The first ovens were built in 1900, so that the district is really but twelve years old. The total production of coke in the Lower Connellsville district in 1912 was 9,023,371 tons, an increase of 1,668,635 tons, or almost 23 per cent. over that of 1911, while the value increased from $12,998,192 to $17,098,420, or almost 33 per cent. The average price per ton in the Lower Connellsville district increased from $1.77 in 1911 to $1.90 in 1912.

While there was a decrease in the total number of ovens in the Connellsville district proper, the ovens of the Lower Connellsville district increased from 14,857 in 1911 to 15,525 ovens in 1912, with 422 new ovens in course of construction. The total number of active ovens was 14,217, producing an average of 642 tons per oven.

The record of the production from the Lower Connellsville district is given in the following tables.

STATISTICS OF THE MANUFACTURE OF COKE IN THE LOWER CONNELLSVILLE DISTRICT, PENNSYLVANIA, 1900, 1905 AND 1908-1912.

Year.	Establishments.	Ovens.		Coal used (short tons).	Yield of coal in coke. Per cent.	Coke produced (short tons).	Total value of coke at ovens.	Value of coke at ovens per ton.
		Built.	Buildings.					
1900,	12	2,633	1,112	579,928	66.5	385,909	$792,886	$2.05
1905,	45	7,484	1,145	5,666,812	68.3	3,871,310	7,532,382	1.95
1908,	62	13,162	1,203	6,156,553	69.1	4,252,222	7,796,860	1.83
1909,	70	14,215	1,036	9,781,803	69.1	6,761,335	12,490,518	1.85
1910,	73	14,805	668	12,130,425	67.8	8,219,492	16,048,675	1.95
1911,	71	14,857	654	10,771,195	68.3	7,354,736	12,998,192	1.77
1912,	74	*15,525	†422	13,456,074	67.1	9,023,371	17,098,420	1.90

*Includes 1,702 rectangular and 360 longitudinal ovens. †Includes 314 rectangular ovens.

NATURAL GAS.

In 1911 the total vlue of the products of the oil and gas wells of Pennsylvania was $29,414,870, and in 1912 was $31,426,424. Of these amounts the value of the natural gas in 1911 was $18,520,796, and in 1912 was $18,539,672.

The following table gives the number of producers, and the value of the gas produced, together with the total number of consumers and the value of the gas consumed for the years 1897-1912; from which it will be seen there has been a continuous increase both in the value of the gas produced in Pennsylvania and also in the value of the gas consumed during this period of time. It is to be noted that the value of the gas consumed in 1912 was about $8,000,000 in excess of the value of the production, which represents the amount of gas piped from West Virginia, less the small amounts of gas which are piped from Pennsylvania into other states.

The table also gives the number of wells drilled in each of the several years, and the total number of productive wells as reported by the producers. It is probable there are many wells in the State which should be classed as gas wells, but concerning which no information is as yet available.

RECORD OF THE NATURAL GAS INDUSTRY IN PENNSYLVANIA, 1897-1912.

Year.	Gas Produced.		Gas Consumed.			Number of Consumers.		
			Wells.			Drilled.		
	Number of producers.	Value.	Domestic.	Industrial.	Value.	Gas.	Dry.	Productive Dec. 31.
1897, ...	176	$6,242,543	*201,059	1,124	$5,392,661	314	96	2,467
1898, ...	232	6,806,742	*213,410	1,021	6,064,477	373	74	2,840
1899, ...	281	8,337,210	*232,060	1,236	7,926,970	467	104	3,303
1900, ...	266	10,215,412	*229,730	1,296	9,812,615	513	142	3,776
1901, ...	296	12,688,161	*326,912	1,743	11,785,996	660	143	4,436
1902, ...	379	14,352,183	185,678	2,448	13,942,783	775	232	5,211
1903, ...	414	16,182,834	214,432	2,834	16,060,196	699	126	5,910
1904, ...	414	18,139,914	238,481	2,929	17,205,804	701	174	6,352
1905, ...	351	19,197,336	257,416	2,845	19,237,218	765	168	6,566
1906, ...	309	18,558,245	273,184	3,307	21,085,077	603	153	7,300
1907, ...	344	18,844,156	295,115	3,812	22,917,547	769	180	8,051
1908, ...	†572	19,104,944	307,585	4,577	20,678,161	571	147	‡8,831
1909, ...	†777	20,475,207	294,781	5,377	21,639,102	756	166	‡9,499
1910, ...	†819	21,057,211	321,430	4,102	23,934,691	837	161	‡10,337
1911, ...	††1,067	18,520,796	330,737	4,597	23,940,001	832	224	‡10,885
1912, ...	††1,104	18,539,672	345,765	3,442	26,486,302	993	219	‡11,543

*Number of fires supplied.

†Includes 216 producers having shallow wells in Erie county for their own domestic consumption in 1908, 311 producers in 1909, 345 producers in 1910, 399 in 1911, and 401 in 1912.

‡Includes 350 shallow wells in Erie county in 1908, 429 in 1909, 429 in 1910, 476 in 1911, and 492 in 1912.

For the purposes of comparison the following table gives the quantity and value of the natural gas produced and consumed in each of the several states for the years 1911-1912, from which it will be seen that notwithstanding the long time gas has been produced from Pennsylvania wells, yet the value of the production is only exceeded by that of West Virginia.

QUANTITY AND VALUE OF NATURAL GAS PRODUCED AND CONSUMED IN THE UNITED STATES IN 1911 AND 1912, BY STATES.

State.	Produced.			Consumed.		
	Quantity M cubic feet.	Cents per M cubic feet.	Value.	Quantity M cubic feet.	Cents per M cubic feet.	Value.
1911						
West Virginia,	206,890,576	13.74	$28,435,907	80,868,645	7.72	$6,240,152
Pennsylvania,	108,869,296	17.01	18,520,796	159,104,376	15.05	23,940,601
Ohio,	49,449,749	18.94	9,367,347	112,123,029	20.33	22,792,270
Oklahoma,	67,275,608	10.01	6,731,770	28,213,871	7.42	2,092,603
Kansas,	38,799,406	12.51	4,854,534	*77,861,143	12.19	9,493,701
New York,	5,239,915	27.07	1,418,767	14,894,303	28.71	4,276,324
Indiana,	4,365,339	27.32	1,192,418	4,365,339	27.32	1,192,418
Texas,	5,503,393	18.44	1,014,945	5,503,393	18.44	1,014,945
Louisiana and Alabama,	9,786,041	8.77	858,145	†9,786,041	8.77	858,145
California,	6,389,820	12.53	800,714	6,389,820	12.53	800,714
Illinois,	6,762,361	10.17	687,726	6,762,361	10.17	687,726
Kentucky,	1,275,397	31.57	407,689	4,734,580	19.05	901,759
Arkansas, Colorado and Wyoming,	2,293,662	12.90	295,858	2,293,662	12.90	295,858
South Dakota,	25,547	66.48	16,984	25,547	66.48	16,984
Missouri,	50,315	20.86	10,496	50,315	20.86	10,496
North Dakota,	13,526	42.42	5,738	13,526	42.42	5,738
Michigan,	1,730	76.88	1,330	1,730	76.88	1,330
Tennessee,	1,200	25.00	300	1,200	25.00	300
Iowa,	140	50.00	70	140	50.00	70
Total,	512,993,021	14.55	$74,621,534	512,993,021	14.55	$74,621,534
1912.						
West Virginia,	215,785,027	13.47	$29,064,968	95,402,248	7.34	$7,001,331
Pennsylvania,	135,452,896	16.85	18,539,672	173,656,003	15.25	26,486,302
Ohio,	56,210,052	21.16	11,891,299	126,854,659	21.44	27,196,162
Oklahoma,	73,709,319	10.04	7,406,528	41,549,403	7.58	3,149,376
Kansas,	28,068,370	15.19	4,264,706	*60,318,286	14.13	8,521,858
New York,	8,625,979	27.17	2,343,379	16,927,598	28.75	4,866,821
Louisiana and Alabama,	14,492,696	12.06	1,747,379	†14,492,696	12.06	1,747,379
Texas,	7,470,373	18.81	1,405,077	7,470,373	18.81	1,405,077
California,	9,354,428	12.13	1,134,456	9,354,428	12.13	1,134,456
Indiana,	3,618,077	28.03	1,014,295	3,618,077	28.03	1,014,295
Illinois,	5,603,368	11.00	616,467	5,603,368	11.00	616,467
Kentucky,	1,869,495	26.63	497,909	5,102,941	20.98	1,070,664
Arkansas, Colorado and Wyoming,	1,742,379	17.78	309,816	1,742,379	17.78	309,816
South Dakota and North Dakota,	54,320	55.99	30,412	54,320	55.99	30,412
Missouri,	53,013	21.83	11,576	53,013	21.83	11,576
Michigan,	1,920	76.56	1,470	1,920	76.56	1,470
Tennessee,	1,500	25.00	375	1,500	25.00	375
Iowa,	240	50.00	120	240	50.00	120
Total,	562,203,452	15.04	$84,563,957	562,203,452	15.04	$84,563,957

*Includes gas piped from Kansas and consumed in Missouri; also gas piped from Oklahoma into Kansas and Missouri.
†Includes gas piped from Lousiana to Texas and from Louisiana to Arkansas.

In the year 1912 the total value of the natural gas consumed in the United States was $10,000,00 more than in 1911. More than one-third of this was due to the increased value of the gas used for domestic purposes in the State of Ohio. One and one-half million dollars is represented by the increased value of the gas used in Pennsylvania for industrial purposes, and $1,000,000 increase in the value of the Pennsylvania consumption for domestic purposes. This will be brought out more fully by the following table which shows the distribution of the natural gas consumption in the several states, and purposes for which used.

DISTRIBUTION OF NATURAL GAS IN THE UNITED STATES IN 1911, BY STATES.

State.	Number of producers.	Consumers.		Gas Consumed.		
				Domestic.		
		Domestic.	Industrial.	Quantity M cubic feet.	Cents per M cubic feet.	Value.
Pennsylvania,	1,067	330,537	4,579	45,505,643	24.53	$11,164,168
Ohio,	1,900	577,263	3,634	57,791,210	27.40	15,837,421
Kansas,*	232	199,523	907	27,688,371	22.82	6,317,307
West Virginia,†	340	87,438	1,566	13,870,321	18.12	2,513,689
New York,	302	116,314	208	13,479,789	30.39	4,096,162
Oklahoma,	204	44,854	1,507	5,816,723	16.88	981,976
Indiana,‡	1,094	31,576	143	3,512,633	29.92	1,050,947
Texas,	29	22,972	303	1,590,858	39.73	631,986
Kentucky,	74	41,201	70	2,193,859	30.57	670,648
Louisiana,§	27	17,964	442	1,369,498	22.84	312,782
Alabama,	7	105	4			
California,	22	10,598	307	543,392	58.42	317,467
Illinois,¶	225	10,078	293	1,263,652	22.85	288,802
Arkansas,	5	5,008	90			
Colorado,	17	1,107	14	737,303	25.41	187,331
Wyoming,	7	354	5			
South Dakota,	34	393	9	18,480	70.80	13,084
Missouri,	44	551	13	44,868	20.44	9,173
North Dakota,	16	255	1	13,276	42.47	5,638
Michigan,	20	16	1	930	100.00	930
Tennessee,	4	1	.....	1,200	25.00	300
Iowa,	5	2	.....	140	50.00	70
Total,	5,675	1,498,110	14,114	175,442,146	25.31	$44,399,881

DISTRIBUTION OF NATURAL GAS IN THE UNITED STATES IN 1911, BY STATES—Continued.

State.	Gas Consumed.					
	Industrial.			Total.		
	Quantity M cubic feet.	Cents per M cubic feet.	Value.	Quantity M cubic feet.	Cents per M cubic feet.	Value.
Pennsylvania,	113,598,733	11.25	$12,775,833	159,104,376	15.05	$23,940,001
Ohio,	54,331,819	12.80	6,954,849	112,123,029	20.33	22,792,270
Kansas,*	50,172,772	6.33	3,176,394	77,861,143	12.19	9,493,701
West Virginia,†	66,998,324	5.56	3,726,463	80,868,645	7.72	6,240,152
New York,	1,414,514	12.74	180,162	14,894,303	28.71	4,276,324
Oklahoma,	22,397,148	4.96	1,110,627	28,213,871	7.42	2,092,603
Indiana,‡	852,706	16.59	141,471	4,365,339	27.32	1,192,418
Texas,	3,912,535	9.79	382,959	5,503,393	18.44	1,014,945
Kentucky,	2,540,721	9.10	231,111	4,734,580	19.05	901,759
Louisiana,§	8,416,543	6.48	545,363	9,786,041	8.77	858,145
Alabama,						
California,	5,846,428	8.27	483,247	6,389,820	12.53	800,714
Illinois,¶	5,498,709	7.25	398,924	6,762,361	10.17	687,726
Arkansas,						
Colorado,	1,556,359	6.97	108,527	2,293,662	12.90	295,858
Wyoming,						
South Dakota,	7,067	55.19	3,900	25,547	66.48	16,984
Missouri,	5,447	24.29	1,323	50,315	20.86	10,496
North Dakota,	250	40.00	100	13,526	42.42	5,738
Michigan,	800	50.00	400	1,730	76.88	1,330
Tennessee,	.....	.....	.....	1,200	25.00	300
Iowa,	.....	.....	.....	140	50.00	70
Total,	337,550,875	8.95	$30,221,653	512,993,021	14.55	$74,621,534

*Includes the consumption of gas piped from Kansas to Missouri and from Oklahoma to Kansas and Missouri.
†Includes the consumption of gas piped from West Virginia to Maryland.
‡Includes the consumption of gas piped from Indiana to Chicago, Ill.
§Includes the consumption of gas piped to Texas from Louisiana and to Arkansas from Louisiana.
¶Includes the consumption of gas piped from Illinois to Vincennes, Ind.

DISTRIBUTION OF NATURAL GAS CONSUMED IN THE UNITED STATES IN 1912, BY STATES.

State.	Number of producers.	Consumers.		Gas Consumed.		
				Domestic.		
		Domestic.	Industrial.	Quantity M cubic feet.	Cents per M cubic feet.	Value.
Ohio,	2,031	641,724	4,414	67,150,744	28.92	$19,420,086
Pennsylvania,	1,104	345,765	3,442	49,331,092	24.64	12,153,254
Kansas,*	253	193,446	1,104	24,821,582	24.25	6,018,363
West Virginia,†	406	94,273	1,953	16,180,778	18.11	2,930,628
New York,	332	129,930	805	15,329,811	29.90	4,583,414
Oklahoma,	242	47,017	1,651	6,500,062	19.83	1,288,894
Louisiana,‡	41	30,205	1,423	2,871,707	28.04	805,265
Alabama,	9	152	4			
Texas,	41	27,226	329	2,341,628	38.71	906,412
California,	43	18,171	232	974,796	53.90	525,428
Kentucky,	88	45,603	103	2,762,671	30.38	839,346
Indiana,§	1,140	27,165	140	2,989,648	30.51	912,252
Illinois,¶	223	10,691	212	1,236,162	23.62	291,987
Arkansas,	6	5,630	87			
Colorado,	16	1,211	12	871,628	28.62	249,501
Wyoming,	8	363	4			
South Dakota,	32	403	3	44,420	56.31	25,012
North Dakota,	13	162	.....			
Missouri,	45	500	11	45,413	20.98	9,526
Michigan,	21	14	2	1,020	100.00	1,020
Tennessee,	7	3	.....	1,500	25.00	375
Iowa,	5	3	.....	240	50.00	120
Total,	6,106	1,621,557	15,936	193,454,802	26.34	$50,960,883

DISTRIBUTION OF NATURAL GAS CONSUMED IN THE UNITED STATES IN 1912, BY STATES—Continued.

State.	Gas Consumed.					
	Industrial.			Total.		
	Quantity M cubic feet.	Cents per M cubic feet.	Value.	Quantity M cubic feet.	Cents per M cubic feet.	Value.
Ohio,	59,703,915	13.02	$7,776,076	126,854,659	21.44	$27,196,162
Pennsylvania,	124,324,911	11.53	14,333,048	173,656,003	15.25	26,486,302
Kansas,*	35,496,704	7.06	2,503,495	60,318,286	14.13	8,521,858
West Virginia,†	79,221,470	5.14	4,070,703	95,402,248	7.34	7,001,331
New York,	1,597,787	17.74	283,407	16,927,598	28.75	4,866,821
Oklahoma,	35,049,341	5.31	1,860,482	41,549,403	7.58	3,149,376
Louisiana,‡	11,620,989	8.11	942,114	14,492,696	12.06	1,747,379
Alabama,						
Texas,	6,128,745	9.72	498,665	7,470,373	18.81	1,405,077
California,	8,379,632	7.27	609,028	9,354,428	12.13	1,134,456
Kentucky,	2,340,370	9.88	231,318	5,102,941	20.98	1,070,664
Indiana,§	628,429	16.24	102,043	3,618,077	28.03	1,014,295
Illinois,¶	4,367,206	7.43	324,480	5,603,368	11.00	616,467
Arkansas,						
Colorado,	870,751	6.93	60,215	1,742,379	17.78	309,816
Wyoming,						
South Dakota,	9,900	54.55	6,400	54,320	55.99	30,412
North Dakota,						
Missouri,	7,600	26.97	2,050	53,013	21.83	11,576
Michigan,	900	50.00	450	1,920	76.66	1,470
Tennessee,	.....	.....	.....	1,500	25.00	375
Iowa,	.....	.....	.....	240	50.00	120
Total,	368,748,650	9.11	$33,603,074	662,203,452	15.04	$84,563,957

*Includes the consumption of gas piped from Kansas to Missouri and from Oklahoma to Kansas and Missouri.
†Includes the consumption of gas piped from West Virginia to Maryland.
‡Includes the consumption of gas piped to Texas from Louisiana and to Arkansas from Louisiana
§Includes the consumption of gas piped from Indiana to Chicago, Ill.
¶Includes the consumption of gas piped from Illinois to Vincennes, Ind.

PETROLEUM.

The total production of petroleum in the United States in 1912 was 222,113,218 barrels. The production of the several fields of the United States for the years 1908-1912 is given in the following table.

PRODUCTION OF PETROLEUM IN THE UNITED STATES, 1908-1912, BY FIELDS, IN BARRELS.

Field.	1908	1909	1910	1911	1912
Appalachian,	24,945,517	26,535,844	26,892,579	23,749,832	26,338,516
Lima-Indiana,	10,032,305	8,211,443	7,253,861	6,231,164	*4,925,906
Illinois,	33,686,238	30,898,339	33,143,362	31,317,038	28,601,308
Mid-Continent,†	48,823,747	50,833,740	59,217,582	66,595,477	65,473,345
Gulf,	15,772,137	10,883,240	9,680,465	10,999,873	8,545,018
California,	44,854,737	55,471,601	73,010,560	81,134,391	86,450,767
Other,	412,674	336,667	358,839	421,616	1,778,358
Total,	178,527,355	183,170,874	209,557,248	220,449,391	222,113,218

*Includes Michigan. †Includes Caddo production for commercial purposes.

While there was an increase of about 2,000,000 barrels in the total production of petroleum in 1912 as compared with 1911, this was not due to any general increase in all the fields. The following table gives the production for 1911 and 1912 in the several petroleum fields of the United States, together with the amount of increase and decrease in each field.

PRODUCTION OF PETROLEUM IN THE UNITED STATES, IN 1911 AND 1912, BY FIELDS, SHOWING PERCENTAGE OF INCREASE OR DECREASE, IN BARRELS.

Field.	Production.		Increase.	Decrease.	Percentage.	
	1911	1912			Increase.	Decrease.
Appalachian,	23,749,832	26,338,516	2,588,684	.....	10.90	.....
Lima-Indiana,	6,231,164	*4,925,906	.....	1,305,258	.....	20.95
Illinois,	31,317,038	28,601,308	.....	2,715,730	.....	8.67
Mid-Continent,†	66,595,477	65,473,345	.....	1,122,132	.....	1.68
Gulf,	10,999,873	8,545,018	.....	2,454,855	.....	22.32
California,	81,134,391	86,450,767	5,316,376	.....	6.34	.....
Other,	421,616	1,778,358	1,356,742	.....	321.84	.....
Total,	220,449,391	222,113,218	1,663,827	.....	.755	.....

*Includes production of Michigan. †Includes Caddo production for commercial purposes.

The following table shows the percentage of total production of petroleum in each of the several fields for 1908-1912, indicating the decline in the Appalachian, the Lima, Indiana, the Illinois, and the Gulf fields, as compared with the increase in the production in the Mid-continent and California fields, in a more striking manner, perhaps, than in any other way.

PERCENTAGES OF TOTAL PETROLEUM PRODUCED IN THE SEVERAL FIELDS, 1908-1912.

Field.	1908	1909	1910	1911	1912
Appalachian,	13.97	14.49	12.83	10.77	11.86
Lima-Indiana,	5.62	4.48	3.46	2.83	2.22
Illinois,	18.87	16.87	15.82	14.21	12.87
Mid-Continent,*	27.35	27.75	28.26	30.21	29.48
Gulf,	8.83	5.94	4.62	4.99	3.85
California,	25.13	30.29	34.84	36.80	38.92
Other,	.23	.18	.17	.19	.80
Total,	100.00	100.00	100.00	100.00	100.00

*Includes Caddo production for commercial purposes.

From 1859 to 1875 the only reported production of petroleum was from the State of Pennsylvania. The following table gives the total production in the several producing states, together with the total for the United States, and the value of the same. The greatest production in the State of Pennsylvania (including New York) was in 1891, when it reached a total of 33,009,236 barrels, being more than 60 per cent. of the entire output of the United States at that time. Since then there has been a continual decline in the output of this State, with the exception of the years 1895, 1896 and 1900, which three years showed slight increases over the year immediately preceding.

PRODUCTION OF PETROLEUM IN THE UNITED STATES, 1859-1912, BY YEARS AND BY STATES, IN BARRELS OF 42 GALLONS.

Year.	Pennsylvania and New York.	Ohio.	West Virginia.	California.	Kentucky and Tennessee.	Colorado.	Indiana.	Illinois.
1859.	2,000	.....	.....	.....	.....	.....	.....	.....
1860,	500,000	.....	.....	.....	.....	.....	.....	.....
1861,	2,113,609	.....	.....	.....	.....	.....	.....	.....
1862,	3,056,690	.....	.....	.....	.....	.....	.....	.....
1863.	2,611,309	.....	.....	.....	.....	.....	.....	.....
1864.	2,116,109	.....	.....	.....	.....	.....	.....	.....
1865,	2,497,700	.....	.....	.....	.....	.....	.....	.....
1866,	3,597,700	.....	.....	.....	.....	.....	.....	.....
1867.	3,347,300	.....	.....	.....	.....	.....	.....	.....
1868,	3,646,117	.....	.....	.....	.....	.....	.....	.....
1869,	4,215,000	.....	.....	.....	.....	.....	.....	.....
1870,	5,260,745	.....	.....	.....	.....	.....	.....	.....
1871,	5,205,234	.....	.....	.....	.....	.....	.....	.....
1872,	6,293,194	.....	.....	.....	.....	.....	.....	.....
1873.	9,893,786	.....	.....	.....	.....	.....	.....	.....
1874.	10,926,945	.....	.....	.....	.....	.....	.....	.....
1875.	8,787,514	.....	.....	.....	.....	.....	.....	.....
1876,	8,968,906	31,763	120,000	12,000	.....	.....	.....	.....
1877,	13,135,475	29,888	172,000	13,000	.....	.....	.....	.....
1878.	15,163,462	38,179	180,000	15,227	.....	.....	.....	.....
1879.	19,685,176	29,112	180,000	19,358	.....	.....	.....	.....
1880,	26,027,631	38,940	179,000	40,552	.....	.....	.....	.....
1881,	27,376,509	33,867	151,000	99,862	.....	.....	.....	.....
1882,	30,053,500	39,761	128,000	128,636	.....	.....	.....	.....
1883.	23,128,389	47,632	126,000	142,857	4,755	.....	.....	.....
1884.	23,772,209	90,081	90,000	262,000	4,148	.....	.....	.....
1885.	20,776,041	661,580	91,000	325,000	5,164	.....	.....	.....

1886,	25,798,000	1,782,970	102,000	377,145	4,726	.....	.....	.....
1887,	22,356,193	5,022,632	145,000	673,572	4,791	76,295	.....	.....
1888,	16,488,668	10,010,863	119,448	690,333	5,096	297,612	.....	.....
1889,	21,487,435	12,471,466	544,113	303,220	5,400	316,476	33,375	1,460
1890,	28,458,208	16,124,656	492,578	307,360	6,000	368,842	63,496	900
1891,	33,009,236	17,740,301	2,406,218	323,600	9,000	665,482	136,634	675
1892,	28,422,377	16,362,921	3,810,086	385,049	6,500	824,000	698,068	521
1893,	20,314,513	16,249,769	8,445,412	470,179	3,000	594,390	2,335,293	400
1894,	19,019,990	16,792,154	8,577,624	705,969	1,500	515,746	3,688,666	300
1895,	19,144,390	19,545,233	8,120,125	1,208,482	1,500	438,232	4,386,132	200
1896,	20,584,421	23,941,169	10,019,770	1,252,777	1,680	361,450	4,680,732	250
1897,	19,262,066	21,560,515	13,090,045	1,903,411	322	384,934	4,122,356	500
1898,	15,948,464	18,738,708	13,615,101	2,257,207	5,568	444,383	3,730,907	360
1899,	14,374,512	21,142,108	13,910,630	2,642,095	18,280	390,278	3,848,182	360
1900,	14,559,127	22,362,730	16,195,675	4,324,484	62,259	317,385	4,874,392	200
1901,	13,831,996	21,648,083	14,177,126	8,786,330	137,259	460,520	5,757,086	250
1902,	13,183,610	21,014,231	13,513,345	13,984,268	185,331	396,901	7,480,896	200
1903,	12,518,134	20,480,286	12,899,395	24,382,472	554,286	483,925	9,186,411	.....
1904,	12,239,026	18,876,631	12,644,686	29,649,434	998,284	501,763	11,339,124	.....
1905,	11,554,777	16,346,660	11,578,110	33,427,473	1,217,337	376,238	10,964,247	181,084
1906,	11,500,410	14,787,763	10,120,935	33,098,598	1,213,548	327,582	7,673,477	4,397,050
1907,	11,211,606	12,207,448	9,095,296	39,748,375	820,844	331,851	5,128,037	24,281,973
1908,	10,584,453	10,858,797	9,523,176	44,854,737	*727,767	379,653	3,283,629	33,686,238
1909,	10,434,300	10,632,793	10,745,092	55,471,601	*639,016	310,861	2,296,086	30,898,339
1910,	9,848,500	9,916,370	11,753,071	73,010,560	*468,774	239,794	2,159,725	33,143,262
1911,	9,200,673	8,817,112	9,795,464	81,134,391	*472,458	226,926	1,695,289	31,317,038
1912,	8,712,076	†8,969,007	12,128,962	86,450,767	*484,368	206,052	970,009	28,601,308
Total,	736,205,411	415,444,184	238,985,483	542,887,881	8,068,961	10,237,571	100,532,249	186,512,968

*No production in Tennessee recorded. †Includes production of Michigan.

PRODUCTION OF PETROLEUM IN THE UNITED STATES, 1859-1912, BY YEARS AND BY STATES, IN BARRELS OF 42 GALLONS—Continued.

Year.	Kansas.	Texas.	Missouri.	Oklahoma.	Wyoming.	Louisiana.	United States.	Total value.
1859,							2,000	$32,000
1860,							500,000	4,800,000
1861,							2,113,609	1,035,668
1862,							3,056,690	3,209,525
1863,							2,611,309	8,225,663
1864,							2,116,109	20,896,576
1865,							2,497,700	16,459,853
1866,							3,597,700	13,455,398
1867,							3,347,300	8,066,993
1868,							3,646,117	13,217,174
1869,							4,215,000	23,730,450
1870,							5,260,745	20,503,754
1871,							5,205,234	22,591,180
1872,							6,293,194	21,440,503
1873,							9,893,786	18,100,464
1874,							10,926,945	12,647,527
1875,							8,787,514	7,368,133
1876,							9,132,669	22,982,822
1877,							13,350,363	31,788,566
1878,							15,396,868	18,044,520
1879,							19,914,146	17,210,708
1880,							26,286,123	24,600,638
1881,							27,661,238	23,512,051
1882,							30,349,897	23,631,165
1883,							23,449,633	25,740,252
1884,							24,218,438	20,476,924
1885,							21,858,785	19,193,694
1886,							28,064,841	20,028,457
1887,							28,283,483	18,856,606
1888,							27,612,025	17,950,353
1889,	500	48	20				35,163,513	26,963,340
1890,	1,200	54	278				45,823,572	30,365,105

1891,	1,400	54	25	30	.....	.....	54,292,635	30,526,753
1892,	5,000	45	10	80	.....	.....	50,514,657	25,906,463
1893,	18,000	50	50	10	.....	.....	48,431,066	28,932,326
1894,	40,000	60	8	130	2,369	.....	49,344,516	35,522,095
1895,	44,430	50	10	37	3,455	.....	52,892,276	57,691,279
1896,	113,571	1,450	43	170	2,878	.....	60,960,361	58,518,709
1897,	81,098	65,975	19	625	3,650	.....	60,475,516	40,929,611
1898,	71,980	546,070	10	.....	5,475	.....	55,364,233	44,193,359
1899,	69,700	669,013	132	.....	5,560	.....	57,070,850	64,603,904
1900,	74,714	836,039	*1,602	6,472	5,450	.....	63,620,529	75,752,691
1901,	179,151	4,393,658	*2,335	10,000	5,400	.....	69,389,194	66,417,335
1902,	331,749	18,083,658	*757	37,100	6,253	348,617	88,766,916	71,178,910
1903,	932,214	17,955,572	*3,000	138,911	8,960	917,771	100,461,337	94,694,050
1904,	4,250,779	22,241,413	*2,572	1,366,748	11,542	2,958,958	117,080,960	101,175,455
1905,	†12,013,495	28,136,189	*3,100	‡	8,454	8,910,416	134,717,580	84,157,399
1906,	†21,718,648	12,567,897	*3,500	‡	§7,000	9,077,528	126,493,936	92,444,735
1907,	2,409,521	12,322,696	*4,000	43,524,128	‖9,339	5,000,221	166,095,335	120,106,749
1908,	1,801,781	11,206,464	*15,246	45,798,765	‖17,775	5,788,874	178,527,355	129,079,184
1909,	1,263,764	9,534,467	*5,770	47,859,218	‖20,056	3,059,531	183,170,874	128,328,487
1910,	1,128,668	8,899,266	*3,615	52,028,718	‖115,430	6,841,395	209,557,248	127,899,688
1911,	1,278,819	9,526,474	*7,995	56,069,637	‖186,695	10,720,420	220,449,391	134,044,752
1912,	1,592,796	11,735,057	¶	51,427,071	‖1,572,306	9,263,439	222,113,218	163,802,334
Total,	49,422,978	168,721,719	54,077	298,267,850	1,998,047	63,087,170	2,820,426,549	2,338,032,130

*Includes the production of Michigan.
†Includes production of Oklahoma.
‡Included with Kansas.
§Estimated.
‖Includes the production of Utah.
¶No production in Missouri.

The following table gives in detail the amount of production in each of the several States for the years 1911-12, as also the total value of the oil produced during the same years, and the average price per barrel for the same.

TOTAL QUANTITY AND VALUE OF PETROLEUM PRODUCED IN THE UNITED STATES AND THE AVERAGE PRICE PER BARREL IN 1911 AND 1912, BY STATES, AND BARRELS.

State.	1911.			1912.		
	Quantity.	Value.	Average price per barrel.	Quantity.	Value.	Average price per barrel.
California,	81,134,391	$38,719,080	$0.477	86,450,767	$39,213,588	$0.454
Colorado,	226,926	228,104	1.005	206,062	199,661	.973
Illinois,	31,317,038	19,734,339	.630	28,601,308	24,332,605	.851
Indiana,	1,695,289	1,228,835	.740	970,009	885,975	.913
Kansas,	1,278,819	608,756	.476	1,592,796	1,095,698	.688
Kentucky,	472,458	328,614	.696	484,363	424,842	.877
Louisiana,	10,720,420	5,668,814	.529	9,263,439	7,023,827	.758
Michigan,	.....	.....	.....	*	*	.....
Missouri,	7,995	7,995	1.000	.....	.....	.....
New York,	952,515	1,248,950	1.311	874,128	1,401,880	1.604
Ohio,	8,817,112	9,479,542	1.075	†8,969,007	†12,085,998	1.347
Oklahoma,	56,069,637	26,451,767	.472	51,427,071	34,672,604	.674
Pennsylvania,	8,248,158	10,894,074	1.321	7,837,948	12,886,752	1.644
Texas,	9,526,474	6,554,552	.688	11,735,057	8,852,713	.754
Utah, }	186,695	124,037	.664	1,572,306	798,470	.507
Wyoming, }						
West Virginia,	9,795,464	12,767,293	1.303	12,128,962	19,927,721	1.643
Total,	220,449,391	$134,044,752	$0.608	222,113,218	$163,802,334	$0.737

*Included in Ohio. †Includes Michigan.

The history of the oil industry shows it is only possible to maintain, let alone increase, the output by the constant drilling of wells, and in the following table is given the number of wells drilled in each of the several fields of the United States in the years 1911 and 1912, by which it will be seen there were 17,178 wells drilled in the United States in the year 1912.

WELL RECORD IN THE UNITED STATES IN 1911 AND 1912, BY FIELDS.

Field.	Wells completed.				Initial daily production (barrels).	
	Oil.	Gas.	Dry.	Total.	Total.	Average per well.
1911.						
Appalachian,	2,978	976	1,060	5,014	28,100	9.44
Pennsylvania and New York,	1,491	219	297	2,007	4,912	3.29
Central and Southeastern Ohio,	765	403	512	1,680	10,923	14.28
West Virginia,	622	351	218	1,191	10,443	16.79
Kentucky,	100	3	33	136	1,822	18.22
Lima-Indiana,	554	23	67	644	7,477	13.50
Lima, Ohio,	480	15	32	527	6,331	13.29
Indiana,	74	8	35	117	1,096	14.81
Illinois,	1,061	41	263	1,365	66,851	63.01
Mid-Continent,	3,796	490	686	4,972	453,907	119.58
Kansas,	172	150	96	418	3,271	19.01
Oklahoma,	3,294	804	489	4,087	262,333	79.64
Northern Texas,	84	4	38	126	19,180	228.33
Caddo,*	246	32	63	341	169,123	687.49
Gulf,	415	50	149	614	106,885	257.55
Coastal Texas,	352	33	117	502	32,740	93.01
Coastal Louisiana,	63	17	32	112	74,145	1,176.90
California,	970	.....	104	1,074	.....	.....
Colorado,	14	.....	18	32	.....	.....
Wyoming and Utah,	37	.....	16	53	.....	.....
Total,	9,825	1,580	2,363	13,768	.....	.....
1912.						
Appalachian,	3,931	1,016	1,077	6,024	142,711	36.3
Pennsylvania and New York,	1,911	239	322	2,472	6,771	3.5
Central and Southeastern Ohio,	846	411	460	1,717	24,193	28.6
West Virginia,	1,062	361	234	1,657	109,804	103.4
Kentucky,	112	5	61	178	1,943	17.3
Lima-Indiana,	547	18	75	640	8,312	15.2
Lima, Ohio,	482	14	55	551	7,229	15.0
Indiana,	65	4	20	89	1,083	16.7
Illinois,	980	23	257	1,260	65,686	67.0
Mid-Continent,	5,786	754	1,189	7,729	348,442	60.2
Kansas,	536	253	160	949	7,245	13.5
Oklahoma,	4,712	438	843	5,993	228,886	48.6
Northern Texas,	299	11	124	434	28,213	94.3
Caddo, La.,	239	52	62	353	84,098	351.9
Gulf,	412	.....	134	546	58,602	142.2
Coastal Texas,	353	.....	109	462	33,082	93.7
Coastal Louisiana,	59	.....	25	84	25,520	432.5
California,	776	.....	71	847	.....	.....
Colorado,	15	.....	13	28	.....	.....
Wyoming and Utah,	59	.....	25	84	.....	.....
Michigan,	6	.....	2	8	.....	.....
Miscellaneous,	.....	.....	12	12	.....	.....
Total for 1912,	12,512	1,811	2,855	17,178	.....	.....
Corresponding total for 1911,	9,825	1,580	2,363	13,768	.....	.....

*Includes Marion County, Tex.

The well record of Pennsylvania is shown by the following table, which gives the total number of productive wells reported as of January 1, 1911, the total number of wells drilled and those abandoned in that year, the total productive wells December 31, 1911, and the corresponding figures for the year 1912. This record does not include the many thousand gas wells within the State.

PETROLEUM WELL RECORD IN 1911 AND 1912, BY COUNTIES.

PENNSYLVANIA.

	1911.					1912.			
	Productive Jan. 1.	Completed.		Abandoned.	Productive Dec. 31.	Completed.		Abandoned.	Productive Dec. 31.
		Oil.	Dry.			Oil.	Dry.		
Allegheny,	1,591	191	24	94	1,688	50	19	74	1,664
Armstrong,	178	10	2	9	179	8	.....	17	170
Beaver,	613	31	5	51	593	33	11	17	609
Butler,	5,351	120	50	355	5,116	258	51	106	5,268
Clarion,	1,696	138	24	42	1,792	39	7	82	1,749
Crawford,	507	115	.....	6	616	24	.....	43	597
Elk,	1,078	47	.....	9	1,116	10	2	8	1,118
Forest,	1,501	172	15	40	1,633	39	15	60	1,612
Greene,	428	70	9	14	484	31	19	19	496
Jefferson,	126	7	.....	2	131	5	6	1	135
Lawrence,	33	35	1	.....	68	113	5	3	178
McKean,	14,630	531	10	106	15,055	288	12	373	14,970
Mercer,	271	2	.....	7	266	11	.....	1	276
Potter,	149	6	.....	70	85	.....	.....	7	78
Tioga,	41	.....	.....	15	26	.....	.....	19	7
Venango,	14,533	736	39	70	15,199	634	27	281	15,552
Warren,	6,348	618	18	60	6,906	189	16	196	6,899
Washington,	1,917	6	5	131	1,792	25	5	89	1,728
Total,	50,991	2,835	202	1,081	52,745	1,757	195	1,396	53,106

In the following table is given the total number of wells drilled in the several districts of the Pennsylvania and New York oil fields for the years 1908-1912, the number of dry wells completed, and the number of productive oil wells. This table also gives the number of completions of wells, productive and dry holes, drilled in each month during this term of years.

NUMBER OF WELLS COMPLETED IN THE PENNSYLVANIA AND NEW YORK OIL FIELDS, 1908-1912, BY DISTRICTS.

District.	Completed.					Dry.					Oil.				
	1908	1909	1910	1911	1912	1908	1909	1910	1911	1912	1908	1909	1910	1911	1912
Bradford,	359	571	344	298	371	44	36	6	16	14	315	535	316	260	335
Allegheny,	473	459	283	194	246	66	40	13	9	17	407	419	219	128	177
Middle,	620	506	235	247	266	89	65	31	39	36	531	441	195	208	226
Venango and Clarion,	1,841	1,881	790	806	1,019	201	199	70	93	90	1,640	1,682	635	642	853
Butler and Armstrong,	520	487	263	219	216	204	178	89	65	59	316	309	152	124	138
Southwest Pennsylvania,	347	319	286	244	354	153	145	76	75	106	194	174	156	129	182
Total,	4,160	4,223	2,201	2,007	2,472	*757	*663	†288	†297	†322	3,403	3,560	1,673	1,491	1,911

*Including gas wells. †Not including gas wells.

NUMBER OF WELLS COMPLETED IN THE PENNSYLVANIA AND NEW YORK OIL FIELDS, 1908-1912, BY MONTHS.

Year,	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1908, ..	241	146	207	324	337	428	417	414	455	434	405	352	4,160
1909, ...	325	298	260	370	436	448	413	384	400	274	368	247	4,223
1910, ...	147	132	109	190	266	250	222	211	179	182	188	125	2,201
1911, ...	106	96	87	130	168	198	191	222	205	210	227	173	2,007
1912, ...	112	91	125	190	232	266	237	284	252	242	228	213	2,472

NUMBER OF OIL WELLS DRILLED IN PENNSYLVANIA AND NEW YORK OIL FIELDS, 1908-1912, BY MONTHS.

Year,	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1908, ..	176	119	151	265	289	352	356	342	379	373	319	282	3,403
1909, ...	268	255	227	317	374	391	359	308	338	215	316	192	3,560
1910, ...	114	94	82	145	213	192	170	158	140	136	146	83	1,673
1911, ...	68	60	52	84	117	152	148	168	170	157	174	141	1,491
1912, ...	73	71	90	150	181	210	191	224	190	190	167	174	1,911

NUMBER OF DRY HOLES DRILLED IN THE PENNSYLVANIA AND NEW YORK OIL FIELDS, 1908-1912, BY MONTHS.

Year,	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1908, ...	65	27	56	59	48	76	61	72	76	61	86	70	*757
1909, ...	57	43	33	53	62	57	54	76	62	59	52	55	*663
1910, ...	33	38	27	45	53	58	52	53	39	46	42	42	*528
1911, ...	22	25	23	33	33	28	19	32	22	22	13	13	†297
1912, ...	21	17	19	23	30	29	28	42	37	26	24	19	†322

*Including gas wells †Not including gas wells.

The following table gives the initial daily production of new wells in the State of Pennsylvania and New York for the years 1908-1912, from which it will be seen that the average production during this 5 years of the new wells drilled ranged from 2.91 barrels in 1908 to 3.99 barrels in 1910.

TOTAL AND AVERAGE INITIAL DAILY PRODUCTION OF NEW WELLS IN THE PENNSYLVANIA AND NEW YORK OIL FIELDS, 1908-1912, BY DISTRICTS.

District.	Total initial production.					Average initial production per well.				
	1908	1909	1910	1911	1912	1908	1909	1910	1911	1912
Bradford,	874	1,345	952	730	817	2.77	2.51	3.01	2.81	2.44
Allegheny,	806	815	368	201	278	1.98	1.94	1.68	1.57	1.57
Middle,	1,257	977	442	541	511	2.37	2.22	2.27	2.60	2.26
Venango and Clarion,	4,052	4,573	1,276	1,302	1,943	2.47	2.72	2.00	2.03	2.28
Butler and Armstrong,	1,532	2,493	1,489	422	696	4.85	8.07	9.80	3.40	5.04
Southwest Pennsylvania,	1,383	1,130	2,156	1,716	2,526	7.13	6.49	13.82	13.30	13.88
Total,	9,904	11,333	6,683	4,912	6,771	2.91	3.18	3.99	3.29	3.54

TOTAL INITIAL DAILY PRODUCTION OF NEW WELLS IN THE PENNSYLVANIA AND NEW YORK OIL FIELDS, 1908-1912, BY MONTHS AND BARRELS.

Year,	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1908,	523	396	478	746	816	960	1,119	1,114	1,013	1,029	964	748	9,904
1909,	869	785	608	930	1,084	1,027	1,011	1,148	1,046	1,082	991	752	11,333
1910,	572	320	211	584	1,355	621	604	924	353	393	448	296	6,683
1911,	204	345	154	313	319	368	435	611	517	507	695	444	4,912
1912,	548	621	613	657	531	588	482	637	720	530	474	370	6,771

Most of the oil produced in the United States is produced under lease, the land owner receiving a certain portion of the oil as royalty in lieu of a money rental, and in the following table is given the amount of oil placed to the credit of the producer and the land owner in each of the several States, the total value of the oil and the price per barrel, together with the average production per well, and the number of acres owned in fee or held under lease for oil purposes. This table covers the years 1911 and 1912.

PRODUCTION AND VALUE OF PETROLEUM, WELL RECORDS, AND ACREAGE FOR THE UNITED STATES IN 1911, BY STATES, FROM STATISTICS FURNISHED BY PRODUCERS.

State.	Production (in barrels).			Value.	Average price per barrel.	Wells.					Average daily production (in barrels) per well.	Acreage.		
	Placed to credit of					Productive Jan. 1.	Completed.		Abandoned.	Productive Dec. 31.				
	Producer.	Landowner.	Total.				Oil.	Dry.				Fee.	Lease.	Total.
California,	77,140,431	3,993,960	81,134,391	$38,719,080	$0.477	5,188	963	104	246	5,905	38.1	326,009	237,552	563,561
Colorado,	222,957	3,969	226,926	228,104	1.005	116	14	18	9	121	5.1	13,230	20,140	33,370
Illinois,	25,878,928	4,734,235	30,608,163	19,505,303	.637	12,171	969	160	387	12,753	4.2	4,033	314,338	318,371
Indiana,	1,106,358	173,143	1,279,501	886,488	.693	6,493	167	10	1,533	5,127	.7	*3,494	123,451	126,945
Kansas,	1,089,890	137,842	1,227,732	626,431	.510	1,787	164	25	194	1,757	1.9	10,031	110,199	120,230
Kentucky,	385,856	47,986	433,842	302,651	.698	988	91	38	91	988	1.2	*3,678	132,435	136,113
Louisiana,	10,356,642	1,892,988	12,249,630	6,317,559	.516	318	302	84	65	555	60.5	24,570	815,791	840,361
Michigan, Missouri,	7,795	200	7,995	7,995	1.000	26	1	3	... .	27	.8	815	5,115	5,930
New York,	868,621	71,106	939,727	1,248,886	1.329	10,874	147	3	396	10,625	.2	*38,690	70,253	108,943
Ohio,	6,464,111	1,004,135	7,468,246	7,567,069	1.013	31,255	1,754	289	1,672	31,337	.7	*29,659	655,327	684,986
Oklahoma,	42,016,485	6,192,090	48,208,575	23,304,883	.485	13,602	2,778	319	682	15,698	8.4	40,621	1,147,969	1,188,590
Pennsylvania,	6,763,085	727,659	7,490,744	9,896,604	1.321	50,991	2,835	202	1,081	52,745	.4	*229,388	797,546	1,026,934
Texas,	7,524,926	897,482	8,422,408	5,540,876	.658	2,507	460	124	494	2,473	9.3	26,415	362,929	389,344
Utah,	172,989	13,706	186,695	124,037	.664	11	1	7	.....	12	3.1	16,000	2,740	18,740
Wyoming,						112	45	9	6	151		12,220	27,330	39,550
West Virginia,	8,347,518	1,166,046	9,513,564	12,375,618	1.301	12,964	664	143	614	13,014	2.0	*13,706	2,689,183	2,720,894
Total,	188,341,592	21,056,547	209,398,139	$126,651,584	$0.604	149,403	11,355	1,544	7,470	153,288	3.7	810,559	7,512,308	8,322,862

*1910 data.

PRODUCTION AND VALUE OF PETROLEUM, WELL RECORDS, AND ACREAGE FOR THE UNITED STATES IN 1912, BY STATES, FROM STATISTICS FURNISHED BY PRODUCERS.

State.	Production (in barrels).			Value.	Average price per barrel.	Wells.					Average daily production (in barrels) per well.	Acreage.		
	Placed to credit of		Total.			Productive Jan. 1.	Completed.		Abandoned.	Productive Dec. 31.		Fee.	Lease.	Total.
	Producer.	Landowner.					Oil.	Dry.						
Alabama.	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	80	9,000	9,080
Arizona,	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	160	.....	160
Arkansas,	.....	.....	.....	.....	.....	.....	.....	5	.....	.....	.....	80	89,800	89,880
California,	83,150,304	3,300,463	86,450,767	$39,213,588	$0.454	5,947	776	71	402	6,321	37.4	334,902	208,926	543,828
Colorado,	204,852	1,200	206,052	199,661	.968	111	15	13	14	112	5.0	9,404	11,365	20,769
Georgia,	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1,500	1,500
Illinois,	23,891,074	4,287,014	28,178,088	24,403,811	.866	12,753	982	208	513	13,222	17.9	3,161	285,046	288,207
Indiana,	736,233	114,364	850,597	793,891	.933	5,127	82	17	1,038	4,171	.6	*	*	*
Kansas,	1,117,325	132,184	1,249,509	832,171	.665	1,757	279	41	224	1,812	1.9	18,458	119,274	137,732
Kentucky,	348,714	43,376	392,090	331,738	.846	988	94	56	183	899	1.2	*	*	*
Louisiana,	9,140,524	1,611,172	10,751,696	7,970,977	.741	555	315	91	90	780	37.7	30,880	263,885	294,765
Michigan,	.....	.....	†	†	.....	} 26	6	2	.....	32	.....	.....	.....	.....
Missouri,	.....	.....	.....	.....	.....	}	.....	1	.....	.....	.....	800	1,920	2,720
New Mexico,	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
New York,	812,334	65,193	877,527	1,346,448	1.534	10,625	248	6	357	10,516	.2	*	*	*
Ohio.	6,709,770	1,011,632	‡7,721,402	‡10,417,921	1.349	31,237	1,485	297	2,083	30,739	.7	*	*	*
Oklahoma,	38,030,156	5,441,310	43,471,466	29,467,275	.678	15,698	3,668	440	651	18,715	6.3	45,231	1,421,117	1,466,348
Oregon,	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	7,000	700	7,700
Pennsylvania.	6,348,298	688,293	7,036,591	11,307,465	1.606	52,745	1,757	195	1,396	53,106	.4	*	*	*
Tennessee.	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	684	27,500	28,184
Texas,	9,776,241	1,199,738	10,975,979	8,100,329	.738	2,473	756	284	246	2,983	10.1	67,923	1,233,537	1,301,360
Utah,	} 1,225,081	347,225	1,572,306	798,470	.507	{ 17	.....	1	4	13	.....	13,717	1,160	14,877
Wyoming,	}					{ 160	59	24	30	189	22.7	20,144	44,666	64,810
West Virginia,	10,160,301	1,424,285	11,584,586	18,785,748	1.602	13,014	1,327	140	616	13,725	2.3	310,799	1,636,611	1,947,410
Total.	191,651,207	19,667,449	211,318,656	$153,969,493	$0.729	153,333	11,849	1,898	7,847	157,335	3.7	.....	.....	.....

*Data for 1912 complete. †Included in Ohio. ‡Includes production of Michigan.

In the tables heretofore given the production of Pennsylvania and of New York has been combined. In the following table the production of these two states is separated, and the output for each one for the years 1908-1912 is given separately. It will be noticed that the rate of decline in both New York and Pennsylvania is about the same.

PRODUCTION OF PETROLEUM IN PENNSYLVANIA AND NEW YORK IN 1908-1912, BY MONTHS, IN BARRELS.

Pennsylvania.

Month.	1908	1909	1910	1911	1912
January,	782,683	759,178	721,627	697,290	562,665
February,	718,905	704,391	621,467	637,719	575,180
March,	835,990	822,600	851,225	722,755	686,178
April,	803,590	784,155	766,700	701,489	699,856
May,	805,930	818,359	759,585	765,470	728,127
June,	819,020	820,155	790,520	704,082	657,545
July,	806,003	792,327	723,646	668,324	678,789
August,	781,988	786,563	763,273	704,627	675,848
September,	786,963	774,750	720,165	661,775	634,114
October,	781,001	758,779	708,453	690,360	686,184
November,	710,246	765,504	678,132	622,543	610,314
December,	792,006	712,642	689,869	671,724	643,148
Total,	9,424,325	9,299,403	8,794,662	8,248,158	7,837,948

New York.

January,	98,776	95,270	90,027	83,160	64,850
February,	87,119	89,526	71,699	73,007	63,080
March,	99,948	100,008	101,406	83,226	73,371
April,	100,511	96,249	92,245	81,239	79,188
May,	97,365	98,490	90,581	88,594	82,085
June,	99,954	99,905	92,064	84,442	73,950
July,	99,338	96,247	89,457	75,885	75,875
August,	95,754	93,900	89,650	81,368	74,663
September,	96,299	93,583	86,428	76,263	68,884
October,	98,556	90,382	86,659	78,469	76,766
November,	89,345	91,058	79,519	70,101	68,045
December,	97,163	90,279	84,103	76,761	73,421
Total,	1,160,128	1,134,897	1,053,838	952,515	874,128

There is a great amount of oil in storage throughout the United States, and the following table gives the amount of oil in stock December 31, 1910, the production during the year 1911, the amount delivered to the trade during that year, and the stock on hand December 31, 1911, together with similar figures for the year 1912, from which it will be noted there was a falling off in the total stock of oil during the year 1912 of almost 15,000,000 barrels. The falling off in the stock of Appalachian oil during the year 1912 was 700,000 barrels.

STOCKS, RUNS, AND DELIVERIES TO TRADE OF PETROLEUM IN 1912, BY FIELDS, IN BARRELS.

Field.	Stocks, Dec. 31, 1910.	Production in 1911.	Deliveries to trade in 1911.	Stocks, Dec. 31, 1911.	Production in 1912.	Deliveries to trade in 1912.	Stocks, Dec. 31, 1912.
Appalachian,	5,006,445	23,749,832	24,021,735	4,734,542	26,338,516	27,042,540	4,030,518
Lima-Indiana,	4,730,409	6,231,164	7,766,588	3,194,985	*4,925,906	5,701,350	2,419,541
Illinois,	31,324,784	31,317,038	38,577,952	24,063,870	28,601,308	36,955,440	15,709,738
Kansas, Oklahoma,	52,659,506	57,348,456	55,578,664	54,429,298	53,019,867	59,063,557	48,385,608
Louisiana,	1,834,775	10,720,420	8,865,472	3,689,723	9,263,439	10,815,888	2,137,274
Texas,	2,358,840	9,526,474	9,030,312	2,855,002	11,735,057	12,102,915	2,487,144
California,	33,085,118	81,134,391	69,979,391	44,240,118	86,450,767	83,138,493	47,552,392
Other,	30,281	421,616	426,437	25,460	1,778,358	1,656,331	147,487
Total,	131,030,158	220,449,391	214,246,551	137,232,998	222,113,218	236,476,514	122,869,702

*Includes production in Michigan.

The oil delivered, of Appalachian grade, was all used for refining purposes while of the remaining oil over one-third was used for fuel purposes. The various figures relating to this are given in the following table.

DELIVERIES TO TRADE OF PETROLEUM AND PURPOSES FOR WHICH SHIPPED IN 1912, BY FIELDS, IN BARRELS.

	1911.			1912.		
	Delivered for—			Delivered for—		
	Refining.	Fuel.	Total.	Refining.	Fuel.	Total.
Appalachian,	a24,021,735	.....	24,021,735	b27,042,540	.....	27,042,540
Lima-Indiana,	7,758,301	8,237	7,766,538	5,688,025	13,325	5,701,350
Illinois,	c38,437,752	140,209	38,577,952	c36,820,455	134,985	36,955,440
Kansas, Oklahoma,	d53,623,845	1,954,819	55,578,664	e58,108,633	954,924	59,063,557
Louisiana,	3,446,410	5,419,062	8,865,472	6,122,753	4,693,135	10,815,888
Texas,	f4,769,305	4,261,007	9,030,312	f7,574,605	4,528,310	12,102,915
California,	g20,120,000	49,859,391	69,979,391	h34,918,167	48,220,326	83,138,493
Other,	225,870	1200,567	426,437	1,641,297	15,034	1,656,331
Total.	152,403,218	61,843,333	214,246,551	177,916,475	58,560,069	236,476,514

a Includes 41,287 barrels of lubricating oil.
b Includes 55,812 barrels of lubricating oil.
c Includes small amount used for street sprinkling.
d Includes 247,511 barrels shipped by rail that can not be classified.
e Includes 271,252 barrels shipped by rail that can not be classified.
f Includes small amount of lubricating oil.
g 3,620,000 barrels estimated used for road oil and gas manufacture.
h 6,000,000 barrels estimated used for road oil and gas manufacture.
i The corresponding amount for 1912 consisted of residum from refined oil.

The following table gives the production of oil from the Appalachian field from the year 1859 to 1912, giving the total amount of production, the percentage of the total output of the United States, the increase or decrease for each year, and the average price obtained for it.

PRODUCTION OF PETROLEUM IN THE APPALACHIAN FIELD, 1859-1912, IN BARRELS.

Year.	Production.	Per cent. of total production.	Increase (+) or decrease (—) from previous year.	Yearly average price per barrel.a
1859,	2,000	100	.....	$16.00
1860,	500,000	100	+498,000	9.59
1861,	2,113,609	100	+1,613,609	.49
1862,	3,056,690	100	+943,081	1.05
1863,	2,611,309	100	+445,381	3.15
1864,	2,116,109	100	—495,200	8.06
1865,	2,497,700	100	+381,591	6.59
1866,	3,597,700	100	+1,100,000	3.74
1867,	3,347,300	100	—250,400	2.41
1868,	3,646,117	100	+298,817	3.62½
1869,	4,215,000	100	+568,883	5.63¾
1870,	5,260,745	100	+1,045,745	3.86
1871,	5,205,234	100	—55,511	4.34
1872,	6,293,194	100	+1,087,960	3.64
1873,	9,893,786	100	+3,600,592	1.83
1874,	10,926,945	100	+1,033,159	1.17
1875,	8,787,514	100	—2,139,431	1.35
1876,	9,120,669	99.87	+333,155	2.56½
1877,	13,337,363	99.90	+4,216,694	2.42
1878,	15,381,641	99.90	+2,044,278	1.19
1879,	19,894,288	99.90	+4,512,647	.85⅞
1880,	26,245,571	99.85	+6,351,283	.94½
1881,	27,561,376	99.64	+1,315,805	.85⅞
1882,	30,221,261	99.58	+2,659,885	.78⅛
1883,	23,306,776	99.39	—6,914,485	1.06¾
1884,	23,956,438	98.92	+649,662	.83⅜
1885,	21,533,785	98.51	—2,422,653	.87⅛
1886,	26,549,827	94.60	+5,016,042	$0.713
1887,	22,878,241	80.90	—3,671,586	.668
1888,	16,941,397	61.36	—5,936,844	.876
1889,	22,355,225	63.57	+5,413,828	.941
1890,	30,073,307	65.63	+7,718,082	.868
1891,	35,848,777	66.03	+5,775,470	.670
1892,	33,432,377	66.19	—2,416,400	.556
1893.	31,365,890	64.76	—2,066,487	.640
1894,	30,783,424	62.38	—582,466	.839
1895,	30,960,639	58.54	+177,215	1.359
1896,	33,971,902	55.73	+3,010,263	1.179
1897,	35,230,271	58.25	+1,258,369	.786
1898,	31,717,425	57.29	—3,512,846	.911
1899,	33,068,356	57.94	+1,350,931	1.294
1900,	36,295,433	57.05	+3,227,077	1.353
1901,	33,618,171	48.45	—2,677,262	1.210
1902,	32,018,787	36.07	—1,599,384	1.238
1903,	31,558,248	31.41	—460,539	1.590
1904,	31,408,567	26.33	—149 681	1.628
1905,	29,366,960	21.80	—2,041,607	1.394
1906,	27,741,472	21.93	—1,625,488	1.598
1907,	25,342,137	15.26	—2,399,335	1.745
1908.	24,945,517	13.97	—396,620	1.780
1909,	26,535,844	14.49	+1,590,327	1.646
1910,	26,892,579	12.83	+356,735	1.336
1911,	23,749,832	10.77	—3,042,748	1.308
1912,	26,338,516	11.86	+2,588,564	1.598

aPrice of oil of "Pennsylvania" grade as given by Seep Purchasing Agency.

In the following table is given the total quantity and value of the production of Appalachian oil from each of the several states for the years 1903-1912.

PRODUCTION AND VALUE OF PETROLEUM IN THE APPALACHIAN FIELD, 1903-1912, BY STATES, IN BARRELS.

Year.	Pennsylvania.		New York.		Southeastern Ohio.		West Virginia.		Kentucky-Tennessee.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
1903,	11,355,156	$18,170,881	1,162,978	$1,849,135	5,586,433	$8,883,182	12,899,395	$20,516,532	554,286	$486,083	31,558,248	$49,905,813
1904,	11,125,762	18,222,242	1,113,264	1,811,837	5,526,571	8,995,386	12,644,686	20,583,781	998,284	984,938	31,408,567	50,598,184
1905,	10,437,195	14,653,278	1,117,582	1,557,630	5,016,736	6,992,885	11,578,110	16,132,631	1,217,337	943,211	29,366,960	40,279,635
1906,	10,256,893	16,596,943	1,243,517	1,995,377	4,906,579	7,839,359	10,120,935	16,170,293	1,213,548	1,031,629	27,741,472	43,633,601
1907,	9,999,306	17,579,706	1,212,300	2,127,748	4,214,391	7,344,408	9,095,296	15,852,428	820,344	862,396	25,342,137	43,766,686
1908,	9,424,325	16,881,194	1,160,128	2,071,533	4,110,121	7,316,617	9,523,176	16,911,865	a727,767	706,811	24,945,517	43,888,020
1909,	9,299,403	15,424,554	1,184,897	1,878,217	4,717,436	7,773,880	10,745,092	17,642,283	a639,016	518,299	26,535,844	43,237,233
1910,	8,794,662	11,908,914	1,053,838	1,414,668	4,822,234	6,469,939	11,753,071	15,723,544	a468,774	324,684	26,892,579	35,841,749
1911,	8,248,158	10,894,074	952,515	1,248,950	4,281,237	5,591,423	9,795,464	12,767,293	a472,458	328,614	23,749,832	30,830,354
1912,	7,837,948	12,886,752	874,128	1,401,880	5,013,110	8,177,189	12,128,962	19,927,721	a484,368	424,842	26,338,516	42,818,384

aNo production in Tennessee recorded.

The following table gives the average price for each month, and for the year, for the period 1903-1912, of Pennsylvania petroleum.

MONTHLY AND YEARLY AVERAGE PRICES OF PIPE-LINE CERTIFICATES OF PENNSYLVANIA PETROLEUM AT WELLS IN DAILY MARKET, 1903-1912, PER BARREL.

Year	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly average.
1903,	$1.52½	$1.50	$1.50	$1.51	$1.51½	$1.50	$1.52½	$1.56	$1.57½	$1.68½	$1.78⅜	$1.88⅜	$1.590
1904,	1.85	1.82	1.72½	1.65½	1.62	1.58⅜	1.52	1.50	1.53⅜	1.56	1.58½	1.57	1.628
1905,	1.43¼	1.39	1.38¼	1.32⅜	1.28⅜	1.27	1.27	1.27	1.35⅜	1.57½	1.59	1.58	1.394
1906,	1.58	1.58	1.58	1.60⅜	1.64	1.64	1.63⅝	1.58	1.58	1.58	1.58	1.58	1.598
1907,	1.58	1.61¼	1.72⅞	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.745
1908,	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.780
1909,	1.78	1.78	1.78	1.78	1.70	1.67½	1.60½	1.58	1.58	1.56½	1.49	1.44⅜	1.646
1910,	1.40⅜	1.40	1.40	1.36⅜	1.35	1.31⅞	1.30	1.30	1.30	1.30	1.30	1.30	1.336
1911,	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.31	1.301
1912,	1.41	1.50	1.50	1.52	1.55	1.59	1.60	1.60	1.60	1.60	1.75	1.96	1.598

In the "History of Clay Working in the United States" by Reis and Leighton, it is stated that the first brick house west of the Alleghenies was built in 1750 at 'Kaskaskia, Pa.' " This was based on an earlier statement in the "Clay Worker," but is evidently a mistake. There does not seem to have been any place of that name in western Pennsylvania, and the earliest references to Kaskaskia, Illinois, speak only of frame or stone houses.

The earliest use of brick in western Pennsylvania was undoubtedly in connection with the building of Fort Pitt by Gen. Stanwix in 1759. Fort Pitt was built on the flood plain between the Allegheny and Monongahela rivers, and undoubtedly the material for the brick used was obtained near the site of the Fort. It has been stated in some histories of Pennsylvania there were 50 brick houses in Pittsburg in 1800, and two brick yards in operation at that time, and it is stated by Reis and Leighton that bricks were being made in Pittsburg in 1760. This reference to the year 1760 evidently means the brick manufactured for Fort Pitt. In 1770, Washington, on his third visit to the site of Pittsburg, in company with Dr. Craik and Captain Crawford, writes in his journal "We lodged in what is called the town, distant about 300 yards from the Fort, at one Semples, who keeps a very good house of public entertainment. The houses, which are built of logs, and ranged in streets, are on the Monongahela, and I suppose may be about 20 in number, and inhabited by Indian traders. The Fort (Pitt) is built in the point between the Allegheny and Monongahela, but not so near the pitch of it as Fort Duquesne stood. It is five sided and regular, two of which near the land are of brick, the others stockade. A moat encompasses it." It would seem evident from this statement that at that time there were no brick houses in Pittsburg.

In reference to the possible number of brick houses in Pittsburg in 1800, Dr. J. H. Bausman, the historian of Beaver County, writes in a letter as follows: "Craig's History of Pittsburg, p. 281, quotes Niles Register, Vol. 30, p. 436 as saying that Pittsburg in 1786 contained 36 log houses, 1 stone and 1 frame house, and 5 small stores. Craig in commenting upon a statement as to the population of the town made by the Pittsburg Gazette in its issue of January 9, 1796, draws up a list of the houses as far as he could remember them for the same period. He finds about 102. Now it does not seem probable to me that in 10 years, as things were then, nearly all of the new houses, about 50, built in that period, 1786-1796, should have been of brick. By the way, in his list, page 280, Craig speaks of Gen. Gibson's (probably Col. John Gibson) house as the first brick house. If then the statement of Niles Register quoted above is exact, Gibson's house must have been built after 1786."

We do know, however, that brick were manufactured in Pittsburg in the year 1804, for at that time the second edifice of the First

Presbyterian Church of Pittsburg was built on Wood Street, and was of brick.

Concerning the use of brick in other portions of Pennsylvania but little is known, although a search of local histories will probably reveal many facts of interest. In 1810 the second courthouse was built at Beaver, near the site of the present building, and was of brick. From the minutes of the Beaver Academy some facts are known as to the value of brick at that time. On March 7, 1812, the Trustees of the Beaver Academy contracted with one Jonathan Mendenhall to have made and *dried* 140,000 brick at $4.50 per thousand, and on July 20th of the same year, a contract was made with Persifor Taylor for the carpenter work of the building for $350 and on July 27th with Jonathan Coulter for the brick and stone work for $498. This building was erected on Irvine Square, the southeastern square of the reserved tract in the center of the town site, and was occupied until sometime in the late 50's.

It will be noted from the above references that Pennsylvania has long been engaged in the manufacture of the commoner grades of clay goods, and the industry ranks as one of the important ones in the State. The production of refractories has naturally been stimulated and encouraged, and the search for high grade refractory materials forced upon the manufacturers, by the iron, steel, glass and other industries which demand high fire resisting materials. The demand for materials of higher fire resisting qualities and better suited to furnace conditions, and the action of the gases and fluxes present, makes the manufacture of refractories one requiring constant change in the materials used, and the methods employed. The advance which has been made in recent years in our knkowledge of technical ceramics, the varying effects of chemical and mineralogical differences in composition of clays, the effects of the fluxes, and of the physical condition in which the clays are found, all as affected by different methods of treatment in manufacture, by various methods of grinding, of compounding, of drying and of burning ceramic wares, gives us hope that a systematic study of the clay resources of the State, and more especially of that portion of the State where our refractory materials are found, and a close study of the conditions attending the manufacture of the various products in the State, will lead not only to an increased output of ceramic wares, but, what is perhaps more important, will lead us to a knowledge of the materials available, and of the conditions requisite for the production of higher grade goods in all respects, and with this in view a detail study of the clay resources of the State is now under way by the Geological Survey.

In the following table will be found the output of the several states, together with the rank of each for the years 1911 and 1912, as regards the value of their clay products, from which will be seen the number of firms in each state, the rank of each state in each year, the total value of the clay products, and the portion of the entire output of the United States which is to be credited to each state.

RANK OF STATES, VALUE OF OUTPUT, AND PERCENTAGE OF TOTAL VALUE OF CLAY PRODUCTS IN 1911 AND 1912.

State or Territory.	1911.				1912.			
	Rank.	Number of operating firms reporting.	Value.	Percentage of total product.	Rank.	Number of operating firms reporting.	Value.	Percentage of total product.
Ohio,	1	633	$32,663,896	20.13	1	596	$34,811,508	20.14
Pennsylvania,	2	423	20,270,033	12.49	2	393	21,537,221	12.46
New Jersey,	3	162	18,178,228	11.21	3	155	19,338,553	11.18
Illinois,	4	330	14,333,011	8.83	4	301	15,210,990	8.80
New York,	5	222	10,184,376	6.28	5	219	12,068,858	6.98
Indiana,	6	302	7,000,771	4.32	6	278	7,935,251	4.59
Missouri,	7	122	6,274,353	3.87	7	110	6,412,861	3.71
California,	8	92	4,915,866	3.03	8	91	5,912,450	3.42
West Virginia,	10	55	4,333,420	2.67	9	54	4,775,874	2.76
Iowa,	9	214	4,432,874	2.73	10	200	4,522,326	2.62
Texas,	12	113	2,659,919	1.64	11	104	2,886,068	1.67
Georgia,	13	109	2,636,380	1.63	12	96	2,806,541	1.62
Michigan,	16	111	2,083,932	1.28	13	101	2,545,498	1.47
Kentucky,	14	96	2,368,094	1.46	14	90	2,443,740	1.41
Washington,	11	55	2,840,372	1.75	15	50	2,388,870	1.38
Kansas,	15	53	2,360,262	1.46	16	46	2,036,500	1.18
Alabama,	17	82	1,947,102	1.20	17	74	1,935,179	1.12
Virginia,	19	77	1,739,900	1.07	18	75	1,874,174	1.09
Maryland,	18	56	1,772,434	1.09	19	55	1,865,753	1.08
Massachusetts,	20	68	1,700,287	1.05	20	63	1,767,166	1.02
Minnesota,	21	81	1,693,478	1.04	21	79	1,611,040	.93
Tennessee,	23	84	1,385,100	.85	22	80	1,501,016	.87
North Carolina,	24	163	1,280,126	.79	23	162	1,465,653	.85
Connecticut and Rhode Island,	25	42	1,257,339	.78	24	41	1,465,000	.85
Colorado,	22	80	1,606,709	.99	25	71	1,437,394	.83
Wisconsin,	26	101	1,158,139	.71	26	92	1,044,486	.61
Nebraska,	28	68	795,894	.49	27	59	806,398	.47
Oregon,	27	63	1,081,025	.67	28	65	734,226	.42
Utah,	33	37	548,955	.34	29	32	724,978	.42
South Carolina,	31	44	669,794	.41	30	42	704,563	.41
Mississippi,	30	63	687,836	.42	31	55	601,799	.35
Oklahoma,	29	40	756,639	.47	32	29	535,318	.31
Maine,	32	52	619,214	.38	33	47	534,101	.31
Louisiana,	34	50	531,949	.33	34	40	523,643	.30
New Hampshire,	36	26	430,748	.27	35	26	492,096	.29
Arkansas,	35	50	480,643	.30	36	43	462,605	.27
Montana,	37	25	260,547	.16	37	23	314,017	.18
Florida,	39	21	217,535	.13	38	18	272,766	.16
North Dakota,	40	11	210,616	.13	39	12	231,245	.13
District of Columbia,	38	9	227,520	.14	40	9	217,486	.13
New Mexico,	43	15	174,651	.11	41	12	185,575	.11
Arizona,	44	20	106,882	.07	42	17	178,564	.10
Idaho and Nevada,	42	36	198,479	.12	43	26	176,108	.10
Delaware,	41	21	200,610	.12	44	17	162,216	.09
Vermont,	45	7	86,466	.05	45	5	79,266	.05
Wyoming,	46	13	77,146	.05	46	10	45,103	.03
South Dakota,	47	8	61,365	.04	47	7	41,496	.02
Porto Rico,	48	18	19,528	.01	48	14	14,294	.01
Other states,	.....	.....	a715,739	.44	.....	.....	a684,442	.40
Total,	.....	4,628	162,236,181	100.00	.....	4,284	172,811,275	100.00

aUndistributed pottery products.

The following table shows the various forms of clay products manufactured, and the total value of the same in the United States for the years 1911 and 1912, together with the amount and percentage of increase and decrease on each item, from which it will be seen that the total increase in 1912 was 6.52 per cent. over and above that of 1911.

VALUE OF THE CLAY PRODUCTS IN THE UNITED STATES IN 1911 AND 1912, WITH INCREASE OR DECREASE.

Product.	1911.	1912.	Increase (+) or decrease (−) in 1912.	Percentage of increase (+) or decrease (−) in 1912.
Common brick,	$49,885,262	$51,796,266	+$1,911,004	+3.83
Vitrified paving brick or block,	11,115,742	10,921,575	−194,167	+1.75
Front brick,	8,648,877	9,455,297	+806,420	+9.32
Fancy or ornamental brick,	177,015	225,367	+48,352	+27.32
Enameled brick,	1,038,865	1,027,314	−11,551	−1.11
Draintile,	8,826,314	8,010,250	−816,064	−9.25
Sewer pipe,	11,454,616	12,147,677	+693,061	+6.05
Architectural terra cotta,	6,017,801	8,580,436	+2,562,635	+42.58
Fireproofing,	5,660,172	7,174,148	+1,513,976	+26.75
Tile (not drain),	5,356,184	5,809,495	+453,311	+8.46
Stove lining,	614,116	516,874	−97,242	−15.83
Fire brick,	16,074,686	17,877,629	+1,802,943	+11.22
Miscellaneous,	2,847,971	2,764,783	−83,188	−2.92
Total brick and tile,	127,717,621	136,307,111	+8,589,490	+6.73
Total pottery,	34,518,560	36,504,164	+1,985,604	+5.75
Grand total,	162,236,181	172,811,275	+10,575,094	+6.52

For the purpose of comparison in the following table will be found the total number of firms reporting, and the value of the several varieties of pottery products in the United States for the years 1901 to 1912. It will be noted from this table there has been a very considerable decrease in the total number of operating firms. This is due partly to the closing of plants which were not well located, or which for some reason had an inefficient management, and in part is probably due to the absorbing of some smaller plants by their larger and more progressive competitors.

VALUE OF POTTERY PRODUCTS IN THE UNITED STATES, 1901-1912, BY VARIETIES.

Year.	Number of operating firms reporting.	Red earthenware.	Stone-ware and yellow and Rockingham ware.	White ware, including C. C. ware, etc.	China, bone China, delft, and belleek ware.	Sanitary ware.	Porcelain electrical supplies.	Miscellaneous.	Total.
1901,	535	$703,698	$2,855,623	$11,608,898	$1,302,864	$2,877,650	$1,141,362	$1,883,750	$22,463,860
1902,	518	735,386	3,383,678	12,371,111	1,219,293	3,555,662	1,350,255	1,512,068	24,127,453
1903,	546	698,175	3,658,836	12,493,012	1,757,502	3,362,263	1,464,980	2,001,284	25,436,052
1904,	556	756,625	3,701,844	11,924,401	1,512,115	3,585,375	1,431,452	2,246,455	25,158,270
1905,	533	780,037	3,969,016	12,809,414	1,558,730	4,580,145	2,253,061	1,967,891	27,918,894
1906,	540	909,262	4,193,884	14,152,503	1,787,776	5,098,310	2,838,284	2,460,865	31,440,884
1907,	509	845,465	4,280,601	13,913,680	1,930,669	4,863,222	2,613,771	1,696,066	30,143,474
1908,	497	757,900	3,518,841	11,474,147	1,581,020	4,373,590	2,009,005	1,421,052	25,135,555
1909,	466	805,906	3,993,859	13,728,316	a1,766,766	5,989,295	3,047,499	a1,717,800	31,049,441
1910,	463	854,196	3,796,688	14,780,980	1,962,126	6,758,996	3,794,153	1,837,539	33,784,678
1911,	449	893,678	4,120,608	14,366,251	2,057,985	7,031,458	4,232,101	1,816,479	34,518,560
1912,	434	958,270	3,919,778	14,829,431	2,177,305	7,902,255	4,927,316	1,789,809	36,504,164

That the relative value of the pottery and brick and tile industry may be better understood the following table gives the value of the output of both brick and tile, and pottery in each of the several states for the years 1911 and 1912.

VALUE OF THE CLAY PRODUCTS IN THE UNITED STATES IN 1911 AND 1912, BY STATES AND TERRITORIES.

State and Territory.	1911.			1912.		
	Brick and tile.	Pottery.	Total.	Brick and tile.	Pottery.	Total.
Alabama,	$1,918,606	$28,496	$1,947,102	$1,912,966	$22,213	$1,935,179
Arizona,	106,882	.....	106,882	178,564	.....	178,564
Arkansas,	465,143	15,500	480,643	433,648	28,957	462,605
California,	4,757,530	158,336	4,915,866	5,692,797	219,653	5,912,450
Colorado,	1,566,636	40,073	1,606,709	1,396,147	41,247	1,437,394
Connecticut and Rhode Island,	1,257,339	*	1,257,339	1,465,000	*	1,465,000
Delaware,	200,610	.....	200,610	162,216	.....	162,216
District of Columbia,	227,520	*	227,520	217,486	*	217,486
Florida,	217,535	.....	217,535	272,766	.....	272,766
Georgia,	2,612,050	24,330	2,636,380	2,787,484	19,057	2,806,541
Idaho and Nevada,	198,479	.....	198,479	176,108	.....	176,108
Illinois,	13,353,200	979,811	14,333,011	14,279,039	931,951	15,210,990
Indiana,	5,996,034	1,004,737	7,000,771	6,858,149	1,077,102	7,935,251
Iowa,	4,396,555	36,319	4,432,874	4,492,185	30,141	4,522,326
Kansas,	2,360,262	*	2,360,262	2,036,500	*	2,036,500
Kentucky,	2,254,000	114,094	2,368,094	2,329,536	114,204	2,443,740
Louisiana,	531,949	*	531,949	523,643	*	523,643
Maine,	619,214	*	619,214	534,101	*	534,101
Maryland,	1,518,023	254,411	1,772,434	1,681,042	184,711	1,865,753
Massachusetts,	1,471,761	228,526	1,700,287	1,515,067	252,099	1,767,166
Michigan,	1,953,442	130,490	2,083,932	2,350,606	194,892	2,545,498
Minnesota,	1,693,478	*	1,693,478	1,611,040	*	1,611,040
Mississippi,	664,176	23,660	687,836	589,093	12,706	601,799
Missouri,	6,269,145	5,208	6,274,353	6,409,346	3,515	6,412,861
Montana,	260,547	*	260,547	314,017	*	314,017
Nebraska,	795,894	.....	795,894	805,398	.....	805,398
New Hampshire,	430,748	*	430,748	492,096	*	492,096
New Jersey,	9,776,287	8,401,941	18,178,228	10,902,633	8,935,920	19,838,553
New Mexico,	174,651	*	174,651	185,575	.....	185,575
New York,	8,006,012	2,178,364	10,184,376	9,653,326	2,405,532	12,058,858
North Carolina,	1,271,570	8,556	1,280,126	1,456,703	8,950	1,465,653
North Dakota,	210,616	.....	210,616	231,245	.....	231,245
Ohio,	17,888,630	14,775,265	32,663,895	19,302,773	15,508,735	34,811,508
Oklahoma,	756,639	.....	756,639	535,318	.....	535,318
Oregon,	1,081,025	*	1,081,025	734,226	*	734,226
Pennsylvania,	18,113,216	2,156,817	20,270,033	19,408,681	2,128,540	21,537,221
Porto Rico,	19,528	*	19,528	14,294	*	14,294
South Carolina,	663,674	6,120	669,794	697,802	6,761	704,563
South Dakota,	61,365	.....	61,365	41,496	.....	41,496
Tennessee,	1,187,961	197,139	1,385,100	1,327,850	173,166	1,501,016
Texas,	2,527,502	132,417	2,659,919	2,739,464	146,604	2,886,068
Utah,	548,955	*	548,955	724,978	*	724,978
Vermont,	86,466	.....	86,466	79,266	.....	79,266
Virginia,	1,726,491	13,409	1,739,900	1,874,174	*	1,874,174
Washington,	2,840,372	*	2,840,372	2,388,870	*	2,388,870
West Virginia,	1,453,218	2,880,202	4,333,420	1,410,708	3,365,166	4,775,874
Wisconsin,	1,149,539	8,600	1,158,139	1,036,586	7,900	1,044,486
Wyoming,	77,146	.....	77,146	45,103	.....	45,103
Other states,	.....	715,739	715,739	.....	684,442	684,442
Total,	$127,717,621	$34,518,560	$162,236,181	$136,307,111	$36,504,164	$172,811,275
Percentage of total,	78.72	21.28	100.00	78.88	21.12	100.00

*Included in "other states."

In the following table will be found the value of the several products manufactured in Pennsylvania for the years 1908 to 1912 under the usual subdivision of the wares made in the State.

CLAY PRODUCTS OF PENNSYLVANIA, 1908-1912.

Product.	1908	1909	1910	1911	1912
Brick:					
Common—					
Quantity,	717,016,000	872,658,000	828,703,000	774,122,000	697,023,000
Value,	$4,539,978	$5,607,490	$5,371,707	$4,963,232	$4,590,784
Average per M,	$6.33	$6.43	$6.48	$6.41	$6.59
Vitrified—					
Quantity,	90,044,000	116,735,000	101,330,000	124,125,000	112,372,000
Value,	$1,038,254	$1,329,317	$1,204,724	$1,511,061	$1,411,096
Average per M,	$11.53	$11.39	$11.89	$12.17	$12.56
Front—					
Quantity,	124,642,000	194,695,000	171,415,000	184,569,000	217,328,000
Value,	$1,403,594	$2,111,536	$2,001,967	$2,111,492	$2,321,479
Average per M,	$11.26	$10.85	$11.68	$11.44	$10.68
Fancy or ornamental, value,	$49,199	$27,993	$35,768	$44,883	$43,186
Enameled, value,	*	*	*	*	*
Fire, value,	$4,252,325	$8,107,807	$6,454,928	$5,555,529	$6,178,870
Stove lining, value,	$129,686	$97,270	$132,567	$164,548	$138,630
Draintile, value,	$14,901	$14,668	$11,480	$12,779	$12,421
Sewer pipe, value,	$578,800	$445,594	$583,418	$560,809	$829,917
Architectural terra cotta, value,	$389,596	$428,522	$472,150	$389,000	$369,943
Fireproofing, terra cotta lumber, hollow building tile or block, value,	$241,175	$324,869	$300,187	$300,687	$350,219
Tile, not drain, value,	$337,948	$441,243	$413,047	$358,913	$385,952
Pottery:					
Red earthenware, value,	$138,181	$159,796	$178,348	$159,420	$162,137
Stoneware and yellow and Rockingham ware, value,	$259,095	$297,029	$323,990	$304,998	$281,526
White ware, including C. C. ware, white granite ware, semiporcelain ware, and semivitreous porcelain ware, value,	$623,544	$812,338	*	*	$902,585
China, bone china, delft, and belleek ware, value,	$69,994	$91,757	$188,122	$216,724	$280,472
Sanitary ware, value,	$175,384	$252,951	$254,747	$215,590	$185,000
Porcelain electrical supplies, value,	.....	*	*	*	$307,636
Miscellaneous, value,	$691,325	$636,552	$4,167,135	$3,400,068	$2,585,368
Total value,	$14,842,982	$21,186,713	$22,094,285	$20,270,033	$21,537,221
Number of operating firms reporting,	466	457	451	423	393
Rank of State,	2	2	2	2	2

*Included in "miscellaneous."

SLATE.

Pennsylvania in 1912 produced slate to the value of $3,474,247 out of a total of $6,043,318 for the United States. The next producing state was Vermont, which had a total production of $1,849,975.

In the following table will be found the value of the slate produced in the United States from 1908 to 1912 by states, together with the amount of increase of 1912 over that of 1911, from which it will be seen that the output increased in each of the several states.

VALUE OF SLATE PRODUCED IN THE UNITED STATES, 1908-1912, BY STATES, WITH PERCENTAGE OF INCREASE OR DECREASE.

State.	1908	1909	1910	1911	1912	Percentage of increase (+) or decrease (—).
Arkansas,	$2,500	.....	.....	*	*	*
California,	60,000	*	*	.....	.....	.....
Georgia,	.....	*	*	*	.....	.....
Maine,	213,707	$227,882	$249,005	$263,516	$282,678	+7.27
Maryland,	102,186	129,538	78,573	76,035	92,184	+21.24
New Jersey,	130,619	*	*	*	*	*
New York,	.....	107,436	84,822	120,359	135,207	+12.34
Pennsylvania,	3,902,958	2,892,358	3,740,806	3,431,351	3,474,247	+1.25
Tennessee,	.....	.....	*	.....	.....	.....
Vermont,	1,710,491	1,841,589	1,894,659	1,624,941	1,849,975	+13.85
Virginia,	194,356	180,775	148,721	188,808	195,392	+3.49
Other states,	.....	†61,840	‡40,173	§23,009	¶13,635	—40.74
Total,	$6,316,817	$5,441,418	$6,236,759	$5,728,019	$6,043,318	+5.50

*Included in "other states."
†Includes California, Georgia, and New Jersey.
‡Includes California, Georgia, New Jersey and Tennessee.
§Includes Arkansas, Georgia, and New Jersey.
¶Includes Arkansas and New Jersey.

In the following table is given the various purposes for which slate was used as produced in each of the several states in the years 1911 and 1912.

PRODUCTION OF SLATE BY STATES, AND PURPOSES FOR WHICH USED, 1911-1912.

1911.

State.	Number of operators.	Roofing Slate.			Mill Stock.						Other.	Total value.
					Manufactured.		Rough.		Total.			
		Number of squares.	Value.	Average price per square.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.		
					Sq. ft.		Sq. ft.		Sq. ft.			
Arkansas,	2	.....	.....	$7 08	.....	.....	.....	.....	.....	.....	.....	*
Georgia,	1	.....	.....	5.50	.....	.....	.....	.....	.....	.....	.....	*
Maine,	5	14,879	$93,074	6.59	394,531	$165,442	.....	.....	394,531	$165,442	.....	$263,516
Maryland,	4	14,816	74,692	5.04	.....	.....	.....	.....	.....	.....	$1,343	76,035
New Jersey,	2	.....	.....	4.03	.....	.....	.....	.....	.....	.....	.....	*
New York,	9	21,542	120,359	5.61	.....	.....	.....	.....	.....	.....	.....	120,359
Pennsylvania.	97	699,344	2,508,435	3.59	3,694,621	547,725	335,042	$27,241	4,029,663	574,966	†347,950	3,431,351
Vermont,	49	328,760	1,335,244	4.06	1,145,703	261,787	174,680	25,410	1,320,383	287,197	2,500	1,624,941
Virginia,	7	40,040	188,808	4.72	.....	.....	.....	.....	.....	.....	.....	188,808
Other states,‡	.....	5,386	22,959	.....	.....	.....	.....	.....	.....	.....	50	23,009
Total,	176	1,124,677	$4,348,571	3.87	5,234,855	$974,954	509,722	52,651	5,744,577	$1,027,605	$351,843	$5,728,019

Arkansas,	1	.....	.....	7.50	.....	.....	.....	.....	.....	.....	.....	*
Maine,	3	16,640	$96,079	5.77	428,689	$186,599	.....	.....	428,689	$186,599	.....	$282,678
Maryland,	4	18,236	90,993	4.99	.....	.....	.....	.....	.....	.....	$1,191	92,184
New Jersey,	2	.....	.....	4.45	.....	.....	.....	.....	.....	.....	.....	*
New York,	10	27,024	135,136	5.00	.....	.....	.....	.....	.....	.....	71	135,207
Pennsylvania,	93	716,770	2,528,791	3.53	3,663,515	520,734	437,682	$32,195	4,101,200	552,929	$392,527	3,474,247
Vermont,	54	373,638	1,576,294	4.22	1,037,513	245,753	146,871	27,829	1,234,384	273,582	99	1,849,975
Virginia,	8	42,220	195,392	4.63	.....	.....	.....	.....	.....	.....	.....	195,392
Other states,‡	.....	2,760	13,500	.....	.....	.....	1,600	110	1,000	110	25	13,635
Total,	175	1,197,288	$4,636,185	3.87	5,179,720	$953,086	585,553	$60,134	5,765,273	1,013,220	$393,913	$6,043,318

*Included in "other states."

†Composed of 4,308,292 school slates, valued at $35,157; 2,636,650 square feet of blackboard material, valued at $300,034; and slate used for other purposes, valued at $12,759.

‡Includes in 1911, Arkansas, Georgia, and New Jersey; in 1912, Arkansas and New Jersey.

§Composed of 4,482,571 school slates, valued at $38,852; 2,989,742 square feet of blackboard material, valued at $352,109; and slate used for structural and other purposes, valued at $1,566.

The production of slate in Pennsylvania continues to be from the counties of Lancaster, York, Lehigh and Northampton. The production from Lancaster and York counties is used exclusively for roofing purposes, while that from Lehigh and Northampton counties is also used for other purposes; black boards, school slates, and other products being cut from the slate, the details of which are given in the following table for each of the counties for the years 1911 and 1912.

PRODUCTION OF SLATE IN PENNSYLVANIA IN 1911 AND 1912, BY COUNTIES AND USES.

1911.

County.	Number of operators.	Number of squares.	Value.	Price per square.	Mill Stock.								Other (value).	Total value.
					Manufactured.		Rough.		Blackboards.		School Slates.			
					Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.		
					Sq. ft.		Sq. ft.		Sq. ft.		No.			
Carbon,	1			$3.58										
Lancaster,	1	17,354	$91,573	5.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	$91,573
York ("Peach bottom slate"),	5			5.55										
Lehigh,	34	160,150	566,101	3.53	506,461	$60,710	194,941	$19,078	1,040,593	$107,967	1,832,293	$14,971	$5,063	773,890
Northampton,	57	521,840	1,850,761	3.55	3,188,160	487,015	140,101	8,163	1,596,057	192,067	2,475,999	20,186	7,696	2,565,888
Total,	98	699,344	2,508,435	$3.59	3,694,621	$547,725	335,042	$27,241	2,636,650	$300,034	4,308,292	$35,157	$12,759	$3,431,351

1912.

Lancaster,	2	18,135	$99,810	$5.71	.....	.....	.....	.....	.....	.....	.....	.....	.....	$99,810
York ("Peach bottom slate"),	3			5.50										
Lehigh,	33	158,603	571,269	3.60	394,419	$53,764	197,930	$19,619	902,697	$101,686	3,109,417	$27,650	.....	773,988
Northampton,	55	540,032	1,857,712	3.44	3,269,099	466,970	239,752	12,576	1,996,045	250,423	1,373,154	11,202	$1,566	2,600,449
Total,	93	716,770	$2,528,791	$3.53	3,663,518	$520,734	437,682	$32,195	2,898,742	$352,109	4,482,571	$38,852	$1,566	$3,474,247

TALC AND SOAPSTONE.

The production of talc and soapstone in the United States is from New York, Vermont, Pennsylvania and New Jersey, Georgia, Maryland and Massachusetts, North Carolina, Virginia and California. It is impossible to separate the production of each of these states without disclosing the individual output of producers, and hence it has been necessary to group some of them. In the following table is given the production of talc produced and marketed in the several states for 1912, together with the value.

QUANTITY AND VALUE OF THE TALC PRODUCED AND MARKETED IN THE VARIOUS STATES IN 1912, IN SHORT TONS.

Rank and State.	Quantity.	Value.	Rank and State.	Quantity.	Value.
1 New York,	66,867	$656,270	5 North Carolina,	3,492	$63,004
2 Vermont,	41,270	245,679	6 Virginia,	3,255	17,186
3 Pennsylvania and New Jersey,	10,400	50,519	7 California,	1,169	15,653
4 Georgia, Maryland and Massachusetts,	6,836	49,172	Total,	133,289	$1,097,483

Talc and soapstone is marketed in the rough state, also as slabs, into which it is sawed at or near the quarry, into various manufactured articles, and ground for use as foundry facings, in paper making, for lubricating, for dressing skins and leather, and other purposes, and the following table gives the quantity and value of the products used for these several purposes in the years 1909 to 1912.

MARKETED PRODUCTION OF TALC AND SOAPSTONE IN THE UNITED STATES, 1909-1912, IN SHORT TONS.

Condition in Which Marketed.	Quantity.	Value.	Average price per ton.	Quantity.	Value.	Average price per ton.
		1911.			1912.	
Rough,	27,412	$79,499	$2.90	15,425	$56,872	$3.69
Sawed into slabs,	2,893	54,009	18.67	9,352	78,042	8.34
Manufactured articles,*	22,646	502,447	22.19	22,363	503,391	22.51
Ground,†	77,387	586,004	7.57	103,576	954,088	9.21
Total,	130,338	$1,221,959	$9.38	150,716	$1,592,393	$10.57
		1909.			1910.	
Rough,	13,304	$56,387	$4.24	15,510	$66,798	$4.31
Sawed into slabs,	3,504	70,641	20.16	2,642	50,334	19.05
Manufactured articles,*	23,179	640,219	28.48	21,557	600,105	27.84
Ground,†	103,564	858,771	8.28	119,561	989,726	8.28
Total,	143,551	$1,646,018	$11.47	159,270	$1,706,963	$10.72

*Includes bath and laundry tubs; fire brick for stoves, heaters, etc.; hearthstones, mantels, sinks, griddles, slate pencils, gas tips, burner blanks, crayons, and numerous other articles for every day use.

†For foundry facings, paper making, lubricators for dressing skins and leather, etc.

The quantity and value of the talc and soapstone produced in each of the several states in the years 1911 and 1912 is given in the following table, together with the percentage of increase or decrease in value.

MARKETED PRODUCTION OF TALC AND SOAPSTONE IN THE UNITED STATES, 1911-12, WITH INCREASE AND DECREASE IN 1912; IN SHORT TONS.

State.	1911.		1912		Increase (+) or decrease (—) in quantity, 1912.	Percentage of increase (+) or decrease (—) in quantity.	Increase (+) or decrease (—) in value, 1912.	Percentage of increase (+) or decrease (—) in value.
	Quantity.	Value.	Quantity.	Value.				
California,	*	*	1,169	$15,653	+1,027	+723.24	+$13,949	+818.60
Massachusetts,	7,642	$36,883	*	*	*	*	*	*
New Jersey and Pennsylvania,	12,131	54,319	10,400	50,519	— 1,731	— 14.27	— 3,800	— 7.00
New York,	62,030	613,286	66,867	656,270	+ 4,837	+ 7.71	+ 42,984	+ 7.01
North Carolina,	3,548	57,101	3,542	63,304	— 6	— 0.17	+ 6,203	+ 10.86
Vermont,	29,488	200,015	42,413	275,679	+12,925	+ 43.83	+ 75,664	+ 37.83
Virginia,	26,759	660,926	25,313	576,473	— 1,446	— 5.40	— 84,453	— 12.78
Other states,†	1,953	23,488	9,566	69,065	+ 113	+ 1.20	+ 10,398	+ 17.68
Total,	143,551	$1,646,018	159,270	$1,706,963	+15,719	+ 10.95	+$60,945	+ $3.70

*Included in "other states."
†Includes California, Georgia, Maryland, and Rhode Island, 1911; Georgia, Maryland, Massachusetts, and Rhode Island, 1912.

LIME.

Pennsylvania far outranks all other states in its production of lime, producing in 1912 over 19 per cent. of the entire output of the United States. The total number of producers in 1912 was 474, or 46 per cent. of entire number of the United States. The great number of producers is due to the fact that we have many manufacturers of lime whose production is used locally for agricultural purposes. The average price of lime in Pennsylvania in 1912 was $3.16 per ton as compared with the average price of the entire United States of $3.96.

The following table gives the production and value of lime produced in the United States for the years 1896 to 1912.

PRODUCTION OF LIME IN THE UNITED STATES, 1896-1912.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Short tons.			Short tons.	
1896, ...	.....	$6,327,900	1905, ...	2,984,100	$10,941,680
1897, ...	.....	6,390,487	1906, ...	3,193,037	12,480,653
1898, ...	.....	6,886,549	1907, ...	3,092,524	12,656,705
1899, ...	.....	6,983,067	1908, ...	2,766,873	11,091,186
1900, ...	.....	6,797,496	1909, ...	3,484,974	13,846,072
1901, ...	.....	8,204,054	1910, ...	3,505,954	14,088,039
1902, ...	.....	9,335,618	1911, ...	3,392,915	13,689,054
1903, ...	.....	9,255,882	1912, ...	3,529,462	13,970,114
1904, ...	2,707,809	9,951,456			

In the following table is given in detail the quantity and value of the lime production in each of the several states for the years 1911 and 1912. This table shows the average price per ton in each of the states, the rank of each state as a producer, and the number of plants in operation in each state.

QUANTITY AND VALUE OF LIME BURNED IN THE UNITED STATES IN 1911 AND 1912, BY STATES, IN SHORT TONS.

1911.

State or Territory.	Rank of state by quantity.	Quantity.	Value.	Rank of state by value.	Average price per ton.	Number of plants in operation.
Alabama,	15	76,406	$300,787	16	$3.94	14
Arizona,	25	13,844	69,940	26	5.05	4
Arkansas,	23	22,847	109,067	23	4.77	6
California,	16	72,858	564,175	7	7.74	22
Colorado,	31	6,403	34,614	31	5.41	7
Connecticut,	17	69,719	328,904	14	4.72	9
Florida,	27	10,867	49,221	27	4.53	4
Georgia,	32	6,282	24,067	36	3.83	3
Hawaii,	39	*	*	34	9.00	1
Idaho,	30	6,809	38,088	29	5.59	7
Illinois,	12	92,169	423,762	11	4.60	16
Indiana,	11	92,229	324,950	15	3.52	12
Iowa,	24	14,791	80,914	24	5.47	4
Kansas,	42	648	3,440	42	5.30	3
Kentucky,	36	4,365	15,121	39	3.46	9
Maine,	6	152,552	773,212	4	5.07	7
Maryland,	10	114,386	362,839	12	3.17	44
Massachusetts,	7	137,440	695,662	6	5.06	12
Michigan,	14	80,709	352,608	13	4.37	15
Minnesota,	19	39,208	242,945	18	6.20	6
Missouri,	5	158,368	722,563	5	4.56	32
Montana,	38	3,100	18,480	38	5.96	3
Nevada,	43	*	*	43	12.50	1
New Jersey,	22	27,057	113,784	22	4.21	17
New Mexico,	41	1,945	13,004	41	6.63	4
New York,	9	119,707	524,845	9	4.38	35
North Carolina,	28	7,809	33,543	32	4.30	6
Ohio,	2	405,562	1,607,524	2	3.96	40
Oklahoma,	37	3,472	14,603	40	4.21	4
Oregon,	35	4,557	38,216	28	8.39	8
Pennsylvania,	1	841,723	2,688,374	1	3.19	561
Porto Rico,	33	6,083	26,075	35	4.29	35
Rhode Island,	40	*	*	37	8.00	1
South Carolina,	29	*	*	33	4.36	2
South Dakota,	34	5,293	37,573	30	7.10	6
Tennessee,	13	91,099	282,763	17	3.10	14
Texas,	18	43,064	218,007	20	5.06	12
Utah,	26	11,681	74,770	25	6.40	13
Vermont,	20	37,333	191,035	21	5.12	10
Virginia,	8	132,133	483,016	10	3.66	45
Washington,	21	35,094	228,933	19	6.52	16
West Virginia,	4	179,966	536,660	8	2.98	27
Wisconsin,	3	250,638	961,558	3	3.84	41
Wyoming,	44	*	*	44	12.64	1
Other states,	.....	†12,699	†79,412	.....	.....	.....
Total,	.....	3,392,915	$13,689,054	.....	$4.03	1,139

*Included in "other states."
†Includes Hawaii, Nevada, Rhode Island, South Carolina, and Wyoming.

QUANTITY AND VALUE OF LIME BURNED IN THE UNITED STATES IN 1911 AND 1912 BY STATES, IN SHORT TONS—Continued.

1912.

State or Territory.	Rank of state by quantity.	Quantity.	Value.	Rank of state by value.	Average price per ton.	Number of plants in operation.
Alabama,	14	79,957	$297,178	17	$3.72	13
Arizona,	24	18,528	101,680	24	5.49	4
Arkansas,	22	22,404	102,833	23	4.59	5
California,	17	72,978	555,822	8	7.62	20
Colorado,	29	7,281	36,478	30	5.01	7
Connecticut,	15	75,981	371,356	12	4.89	10
Florida,	27	12,327	69,938	25	5.67	4
Georgia,	32	*	*	33	4.53	2
Hawaii,	35	*	*	31	9.00	1
Idaho,	28	7,402	42,380	28	5.73	7
Illinois,	12	98,450	394,892	11	4.01	15
Indiana,	13	98,086	329,893	14	3.36	12
Iowa,	26	12,935	51,800	27	4.00	3
Kansas,	42	232	1,131	42	4.88	3
Kentucky,	36	3,397	11,577	39	3.41	7
Maine,	5	155,559	644,255	7	4.14	5
Maryland,	9	112,104	365,037	13	3.26	40
Massachusetts,	7	141,384	738,597	4	5.12	12
Michigan,	16	74,720	311,448	16	4.17	11
Minnesota,	19	44,063	269,841	18	6.12	6
Missouri,	6	148,885	721,896	6	4.85	28
Montana,	37	*	*	35	7.23	2
New Jersey,	25	16,538	65,241	26	3.94	17
New Mexico,	41	1,325	9,434	40	7.12	3
New York,	10	109,800	495,265	9	4.51	31
North Carolina,	30	6,693	30,559	32	4.57	4
Ohio,	2	464,479	1,929,584	2	4.15	35
Oklahoma,	39	2,651	13,538	38	5.11	3
Oregon,	31	6,164	39,323	29	6.38	5
Pennsylvania,	1	849,159	2,679,420	1	3.16	474
Porto Rico,	33	4,907	23,971	36	4.89	45
Rhode Island,	38	*	*	37	6.50	1
South Carolina,	40	*	*	41	3.83	1
South Dakota,	34	3,914	28,585	34	7.30	5
Tennessee,	11	101,339	316,364	15	3.12	15
Texas,	18	45,529	236,101	19	5.19	9
Utah,	23	20,325	111,291	22	5.48	12
Vermont,	20	39,572	205,409	21	5.19	10
Virginia,	8	124,711	488,628	10	3.92	45
Washington,	21	29,078	206,032	20	7.09	11
West Virginia,	4	232,584	734,644	5	3.16	30
Wisconsin,	3	263,052	825,551	3	3.14	43
Wyoming,	43	*	*	43	12.76	1
Other states,	.....	†17,969	†113,142	.....	.....	.....
Total,	.....	3,529,462	13,970,111	.....	$3.96	1,017

*Included in "other states."
†Includes Georgia, Hawaii, Montana, Rhode Island, South Carolina, and Wyoming.

Lime is used for many more purposes than is generally supposed, and in the following table is given the quantity and value of the lime used for the principal uses.

PRODUCTION OF LIME IN THE UNITED STATES IN 1911 AND 1912, BY USES, IN SHORT TONS.

1911.

	Quantity.	Value.	Average price per ton.
Building lime,	1,488,567	$6,755,889	$4.54
Chemical works,	226,215	933,957	3.65
Paper mills,	286,485	1,107,879	3.87
Sugar factories,	36,424	242,344	6.65
Tanneries,	30,167	138,352	4.59
Fertilizer,	596,664	1,714,386	2.87
Dealers—uses not specified,	531,249	2,202,286	4.15
Other uses,*	167,144	593,961	3.55
Total,	3,392,915	$13,689,054	$4.03
Hydrated lime, included in total,	304,593	1,372,057	4.50

1912.

Building lime,	1,556,446	$6,571,479	$4.22
Chemical works,	282,984	989,309	3.50
Paper mills,	290,347	1,107,532	3.81
Sugar factories,	30,988	186,164	6.01
Tanneries,	40,595	178,686	4.40
Fertilizer,	604,607	1,852,530	3.06
Dealers—uses not specified,	560,286	2,467,694	4.40
Other uses,*	157,843	597,443	3.79
Total,	3,529,462	$13,970,114	$3.96
Percentage of increase in 1912,	4.02	2.05	.....
Hydrated lime, included in total,	416,890	1,829,064	4.39
Percentage of increase in 1912,	36.87	33.31	.....

*Includes lime for sand-lime brick, slag cement, alkali works, steelworks, glassworks, smelters, sheep dipping, disinfectant, manufacture of soap, cyanide plants, glue factories, purification of water, etc.

There has been in recent years quite an increase in the amount of hydrated lime used. This growth is indicated by the following table which shows the number of plants in operation in each of the several states. *a*

a See report of Topographic and Geologic Survey Commission for 1910-12 for a short account of the hydrating plants in the York Valley region.

NUMBER OF LIME-HYDRATING PLANTS IN OPERATION IN 1906-1912, BY STATES.

State or Territory.	1906	1907	1908	1909	1910	1911	1912
Alabama,	1	1	1	3	2	2	2
Arizona,	1	1	1	1	1	1	.....
California,	.....	1	2	2	2	3	3
Colorado,	.....	1	.....	1	1	.....	.....
Connecticut,	1	.....	.....	1	.....	.....	1
Florida,	.....	.....	1	.....	1	.....	.....
Georgia,	2	1	1	.....	.....	1	1
Hawaii,	.....	.....	.....	.....	1	.....	.....
Idaho,	.....	.....	.....	1	1	1	1
Illinois,	.....	1	1	2	2	1	1
Indiana,	2	2	2	2	2	2	2
Iowa,	1	.....	.....	1	.....	.....	.....
Kansas,	1	1	.....	1	.....	.....	.....
Maine,	1	1	1	1	1	1	1
Maryland,	.....	.....	1	1	3	3	3
Massachusetts,	.....	.....	.....	.....	1	2	.....
Michigan,	1	1	2	1	1	3	1
Missouri,	.....	2	2	3	3	3	4
New Jersey,	.....	.....	1	1	.....	2	1
New York,	1	2	2	3	.....	2	3
North Carolina,	.....	.....	.....	.....	.....	1	.....
Ohio,	8	9	11	8	11	15	17
Pennsylvania,	8	6	11	9	8	8	15
South Dakota,	.....	.....	.....	.....	1	1	.....
Tennessee,	.....	.....	1	1	1	1	1
Texas,	.....	.....	1	3	3	3	3
Virginia,	.....	.....	1	2	.....	1	.....
Washington,	.....	.....	.....	.....	.....	1	1
West Virginia,	1	1	1	.....	2	1	2
Wisconsin,	1	2	2	2	2	1	1
Total,	30	33	46	50	51	60	64

CEMENT.

There is no branch of the mineral industry which has shown greater changes in recent years than the cement business. The details of these changes will be shown in the following tables. The marked decrease in the output of Natural Cement together with the remarkable growth of the Portland Cement industry is well illustrated in Pennsylvania.

Portland Cement, Natural Cement and Puzzolan Cement are all produced in Pennsylvania. Owing to the few producers in the State it is impossible to give any details of the production of either Puzzolan or Natural Cement without disclosing individual production.

The following table shows the number of plants in the United States producing Puzzolan Cement in the years 1908 to 1912 together with the production in barrels and the value of the same.

STATISTICS OF THE PUZZOLAN-CEMENT INDUSTRY, 1908-1912.

	1908	1909	1910	1911	1912
Number of plants reporting production:					
Alabama,	1	1	1	1	1
Illinois,	.....	.....	.....	.....	.....
Kentucky,	.....	.....	.....	.....	.....
Maryland,	.....	.....	.....	.....	.....
New Jersey,	.....	.....	.....	.....	.....
New York,*	.....	.....	.....	1	1
Ohio,	2	2	2	1	1
Pennsylvania,	1	1	1	1	1
Total,	4	4	4	4	4
Production in barrels of 330 pounds,	151,451	160,646	95,951	93,230	91,864
Value of production,	$95,468	$99,483	$63,286	$77,786	$77,363

*Includes production of Collos cement in 1911 and 1912.

The following table gives the production of Puzzolan Cement for the years 1896 to 1912. From this table it will be seen that the production rose from 12,000 barrels in 1896 to 526,000 barrels in 1903 and 557,000 barrels in 1907. This maximum production had declined in 1912 to less than 92,000 barrels.

OUTPUT OF PUZZOLAN CEMENT IN THE UNITED STATES, 1896-1912, IN BARRELS OF 330 POUNDS.

1896,	12,265	1906,	481,224
1897,	48,329	1907,	557,252
1898,	150,895	1908,	151,451
1899,	335,000	1909,	160,646
1900,	446,609	1910,	95,951
1901,	272,689	1911,	93,230
1902,	478,555	1912,	91,864
1903,	525,896		
1904,	303,045	Total,	4,587,348
1905,	382,447		

*Includes output of Collos cement in 1911 and 1912.

NATURAL CEMENT.

In the following table is given the production of Natural Cement from 1818 to 1912, from which it will be seen that the greatest output was 9,868,000 barrels in 1899, from which maximum production there has been a decline until in 1912 the total output was but 821,000 barrels.

PRODUCTION OF NATURAL CEMENT IN THE UNITED STATES, 1818-1912, IN BARRELS OF 265 POUNDS.

1818-1829,	300,000	1895,	7,741,077
1830-1839,	1,000,000	1896,	7,970,450
1840-1849,	4,250,000	1897,	8,311,688
1850-1859,	11,000,000	1898,	8,418,924
1860-1869,	16,420,000	1899,	9,868,179
1870-1879,	22,000,000	1900,	8,383,519
1880,	2,030,000	1901,	7,084,853
1881,	2,440,000	1902,	8,044,305
1882,	3,165,000	1903,	7,030,271
1883,	4,190,000	1904,	4,866,331
1884,	4,000,000	1905,	4,473,049
1885,	4,100,000	1906,	4,055,797
1886,	4,186,152	1907,	2,887,700
1887,	6,692,744	1908,	1,686,862
1888,	6,253,295	1909,	1,537,638
1889,	6,531,876	1910,	1,139,239
1890,	7,082,204	1911,	926,091
1891,	7,451,535	1912,	821,231
1892,	8,211,181		
1893,	7,411,815	Total,	231,526,464
1894,	7,563,488		

The following table shows the production of Natural Cement by states. In order to avoid disclosure of the individual production the output in the 9 states in which there are operating plants is divided into four groups. There being but two plants in Pennsylvania it is impossible to give the State production and in this case it is combined with that of New York.

PRODUCTION OF NATURAL CEMENT IN 1911-12, BY STATES.

State.	1911.			1912.		
	Producing plants.	Quantity (barrels).	Value.	Producing plants.	Quantity (barrels).	Value.
New York,	4	429,832	$178,937	4	366,236	$162,376
Pennsylvania,	2			2		
Illinois,	1			1		
Indiana,	1	257,859	86,370	1	229,901	91,787
Ohio,	1			1		
Minnesota,	2	192,000	86,640	2	213,500	104,625
Kansas,	1			1		
Georgia,	2	46,400	26,586	2	11,594	8,434
Texas,	1			1		
Total,	15	926,091	$378,533	15	821,231	$367,222

PORTLAND CEMENT.

The growth of the Portland Cement industry and the decline in price are both well known features and are illustrated in the following tables.

The average price of Portland Cement of the Lehigh district in 1912 was $.674 per barrel, equivalent to $5.09 per net ton. This average price when compared with the average price of lime per ton, $3.16, and the marked difference in the cost of production in labor about the plants and in the cost of erection and maintainance of lime and Portland cement plants, seems somewhat remarkable and it is certainly an evidence of fine business management and perfection of factory equipment that the output of Portland cement can be maintained at the ruling price.

The following table shows the production of Portland cement in the United States from 1870 to 1912, during which period almost 600,000,000 barrels of Portland cement have been manufactured.

PRODUCTION OF PORTLAND CEMENT IN THE UNITED STATES, 1870-1912, IN BARRELS.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
1870-1879.	82,000	*$246,000	1899.	5,652,266	$8,074,371
1880.	42,000	126,000	1900.	8,482,020	9,280,525
1881.	60,000	150,000	1901.	12,711,225	12,532,360
1882.	85,000	191,250	1902.	17,230,644	20,864,078
1883.	90,000	193,500	1903.	22,342,973	27,713,319
1884.	100,000	210,000	1904.	26,505,881	23,355,119
1885.	130,000	292,500	1905.	35,246,812	33,245,867
1886.	150,000	292,500	1906.	46,463,424	52,466,186
1887.	250,000	487,500	1907.	48,785,390	53,992,551
1888.	250,000	487,500	1908.	51,072,612	43,547,679
1889.	300,000	500,000	1909.	64,991,431	52,868,354
1890.*	335,500	704,050	1910.	76,549,951	68,205,800
1891.	454,813	967,429	1911.	78,528,637	66,248,817
1892.	547,440	1,153,600	1912.	82,438,096	67,022,172
1893.	590,652	1,158,138	Total.	590,190,930	$562,248,143
1894.	798,757	1,383,473			
1895.	990,324	1,586,830			
1896.	1,513,023	2,424,011			
1897.	2,677,775	4,315,891			
1898.	3,692,284	5,970,773			

*The figures for 1890 and previous years were estimates made at the close of each year and are believed to be substantially correct. Since 1890 the official figures are based on complete returns from all producers.

The following table shows the price of Portland Cement from 1870 to 1912, from which the decline from about $3.00 per barrel to $.813 per barrel in 1912 is to be noted.

AVERAGE PRICE PER BARREL OF PORTLAND CEMENT, 1870-1912.

1870-1880,	$3.00	1898,	$1.62
1881,	2.50	1899,	1.43
1882,	2.01	1900,	1.09
1883,	2.15	1901,	.99
1884,	2.10	1902,	1.21
1885-1888,	1.95	1903,	1.24
1889,	1.67	1904,	.88
1890,	2.09	1905,	.94
1891,	2.13	1906,	1.13
1892,	2.11	1907,	1.11
1893,	1.91	1908,	.85
1894,	1.73	1909,	.813
1895,	1.60	1910,	.891
1896,	1.57	1911,	.844
1897,	1.61	1912,	.813

In common with some other industries the output of Portland Cement has been grouped by districts, and the greatest producing district in the United States is almost entirely embraced in the eastern portion of Pennsylvania in the well known Lehigh region. In the western portion of Pennsylvania there are four plants producing Portland cement, but in order to avoid disclosure of individual production these have been grouped with plants in Ohio. The following table shows the number of active plants in each of the several districts of the United States together with the production and shipments of cement in barrels and the average prices at the factory for the years 1911 and 1912. From this table it will be noted there was an increase in the production and also a corresponding increase in the amount of cement sold in 1912 as compared with 1911. It is also shown by this table that there was a slight decrease in price per barrel during the same period. This decrease in price was universal over most of the United States and prevailed in both the Lehigh region and in western Pennsylvania.

PRODUCTION AND SHIPMENTS OF PORTLAND CEMENT IN 1911 AND 1912, BY COMMERCIAL DISTRICTS.

(Figures opposite "P" relate to production; those opposite "S" relate to shipments.)

District.		Active Plants.		Production and Shipments (Barrels).		Percentage of change, 1912.	Average Factory Price Per Barrel.		Percentage of change, 1912.
		1911.	1912.	1911.	1912.		1911.	1912.	
Lehigh district (New Jersey and eastern Pennsylvania),	P.	24	22	25,972,108	24,762,083	− 4.65	.....	.....	.....
	S.	25	25	25,192,464	26,013,891	+ 3.26	$0.715	$0.674	−5.73
New York,	P.	7	7	3,314,217	4,492,806	+35.56	.....	.....	.....
	S.	8	7	3,058,463	4,543,060	+48.54	.805	.759	−5.71
Ohio and western Pennsylvania,	P.	9	9	6,756,313	7,359,402	+ 8.92	.....	.....	.....
	S.	9	9	6,654,269	7,398,753	+11.19	.766	.757	−1.17
Michigan and northeastern Indiana,	P.	13	12	4,519,726	4,308,645	− 4.67	.....	.....	.....
	S.	14	12	4,550,896	4,417,808	− 2.92	.827	.851	+2.92
Kentucky and southern Indiana,	P.	3	3	2,818,820	3,091,603	+ 9.67	.....	.....	.....
	S.	3	3	2,800,526	3,134,841	+11.94	.793	.764	−3.65
Illinois and northwestern Indiana,	P.	6	6	8,617,341	10,659,357	+23.69	.....	.....	.....
	S.	6	6	8,537,442	10,677,479	+25.07	.791	.744	−5.94
Southeastern states (Maryland, Virginia West Virginia, Tennessee, Georgia and Alabama)	P.	11	9	4,049,063	4,737,257	+16.99	.....	.....	.....
	S.	10	11	3,723,183	5,081,209	+36.47	.793	.737	−7.06
Iowa and Missouri,	P.	7	8	6,067,449	7,583,933	+24.99	.....	.....	.....
	S.	7	8	5,932,856	7,804,901	+31.55	.862	.832	−3.48
Great Plains states (Kansas, Oklahoma, and central Texas),	P.	17	15	7,010,396	5,807,043	−17.16	.....	.....	.....
	S.	16	17	6,332,698	6,174,085	− 2.5	.834	.866	+3.83
Rocky Mountain states (Colorado, Utah, Montana, and Western Texas),	P.	7	7	2,124,930	2,299,252	+ 8.20	.....	.....	.....
	S.	7	7	1,994,790	2,231,602	+12.02	1.186	1.165	−1.77
Pacific coast states (California and Washington),	P.	11	11	7,278,274	7,336,715	+ .80	.....	.....	.....
	S.	11	11	6,770,242	7,531,927	+11.25	1.406	1.358	−3.41
Total,	P.	115	109	78,528,637	82,438,096	+ 4.97	.....	.....	.....
	S.	116	116	75,547,829	85,012,556	+12.53	$0.844	$0.813	−3.67

The following table shows the total production of Portland Cement in the United States and also that part produced in the Lehigh region from the year 1890 to 1912. It is to be noted from this table there has been a continuing increase in the output of cement in the Lehigh district, but that the portion produced in that district compared with the total for the United States fell from 60 per cent. in 1890 to 30 per cent. in 1912.

PORTLAND CEMENT PRODUCTION IN THE LEHIGH DISTRICT AND IN THE UNITED STATES, 1890-1912, IN BARRELS.

Year.	Lehigh district output.	Total output, United States.	Percentage of total manufactured in Lehigh district.	Year.	Lehigh district output.	Total output, United States.	Percentage of total manufactured in Lehigh district.
1890,	201,000	335,500	60.0	1902,	10,829,922	17,230,644	62.8
1891,	248,500	454,813	54.7	1903,	12,324,922	22,342,973	55.2
1892,	280,840	547,440	51.3	1904,	14,211,039	26,505,881	53.7
1893,	265,317	590,652	44.9	1905,	17,368,687	35,246,812	49.3
1894,	485,329	798,757	60.8	1906,	22,784,613	46,463,424	49.0
1895,	634,276	990,324	64.0	1907,	24,417,686	48,785,390	50.0
1896,	1,048,154	1,543,023	68.1	1908,	20,200,387	51,072,612	39.6
1897,	2,002,059	2,677,775	74.8	1909,	24,246,706	64,991,431	37.3
1898,	2,674,304	3,692,284	72.4	1910,	26,315,359	76,549,951	34.4
1899,	4,110,132	5,652,266	72.7	1911,	25,972,108	78,528,637	33.1
1900,	6,153,629	8,482,020	72.6	1912,	24,762,082	82,438,096	30.0
1901,	8,595,340	12,711,225	67.7				

SAND AND GRAVEL.

As a producer of sand and gravel Pennsylvania ranks first in the United States, producing in 1912 $3,371,513 in value of a total of $23,113,208, or 14½ per cent. of the total. Of this total the value of the gravel produced was $456,905, leaving the value of the sand $2,914,608.

The growth of the sand and gravel industry has been quite marked as is shown in the following table, which gives the total quantity reported for the years 1903 to 1912.

QUANTITY AND VALUE OF SAND AND GRAVEL PRODUCED IN THE UNITED STATES, 1903-1912, IN SHORT TONS.

Years.	Sand and Gravel.	
	Quantity.	Value.
1903,	2,110,660	*$1,831,210
1904,	10,679,728	*5,748,099
1905,	13,204,967	11,223,645
1906,	32,932,002	12,698,268
1907,	41,851,918	14,492,069
1908,	37,216,044	13,270,032
1909,	59,565,551	18,336,930
1910,	69,410,436	21,927,630
1911,	66,846,979	21,158,743
1912,	68,318,877	23,081,505

*Includes a very small quantity of gravel.

GLASS SAND.

Pennsylvania still continues to be the largest producer of glass sand, producing in 1912 a value of $517,383 out of a total of $1,430,471, or over 36 per cent. of the total. The following table gives the quantity and value of the glass sand produced in the United States for the years 1903 to 1912.

QUANTITY AND VALUE OF GLASS SAND PRODUCED IN THE UNITED STATES, 1903-1912, IN SHORT TONS.

Years.	Glass Sand.	
	Quantity.	Value.
1903,	823,044	$855,828
1904,	858,719	796,492
1905,	1,060,334	1,107,730
1906,	1,089,430	1,208,788
1907,	1,187,296	1,250,067
1908,	1,093,553	1,134,599
1909,	1,104,000	1,163,375
1910,	1,461,089	1,516,711
1911,	1,538,666	1,543,733
1912,	1,465,386	1,430,471

The following table gives the quantity and value of the several classes of sand produced in Pennsylvania for 1911 and 1912.

PRODUCTION OF SAND AND GRAVEL IN PENNSYLVANIA, AND USES IN 1911 AND 1912.

	Glass Sand.		Molding Sand.		Building Sand.		Grinding & Polishing.		Fire Sand.		Engine Sand.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
1911,	478,089	$668,247	657,197	$451,779	2,072,830	$882,516	500,604	$326,460	37,638	$33,238	167,203	$110,017
1912,	427,936	517,383	792,150	627,532	1,648,996	789,819	679,155	399,881	150,918	111,023	128,162	78,671

	Furnace Sand.		Paving Sand.		Other Sands.		Total Sand.		Gravel.		Grand Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
1911,	53,015	$28,884	259,121	$88,992	85,968	$84,861	4,311,665	$2,675,024	1,377,394	$350,243	5,689,059	$3,025,267
1912,	.....	.....	304,288	134,604	457,153	255,695	.....	.....	1,921,425	456,905	6,509,333	3,371,513

MINERAL WATERS.

There was practically no changes in the production of mineral waters in 1912 as compared with 1911.

The following table gives the details of the production of mineral waters in Pensylvania for the years 1908 to 1912.

PRODUCTION AND VALUE OF MINERAL WATERS IN PENNSYLVANIA, 1908-1912.

Year.	Commercial springs.	Quantity sold (gallons).	Value.	Average price per gallon received.
				Cents.
1908,	32	1,430,489	$180,889	12.6
1909,	42	2,177,967	240,856	11.1
1910,	44	2,536,337	221,685	8.7
1911,	41	2,327,732	216,819	9.3
1912,	41	2,192,106	204,906	9.3

In the number of commercial springs reporting in the United States, Pennsylvania ranks fourth; in the total quantity of water sold it ranks eighth; and in the value of water sold the State ranks tenth. The number of springs reporting in 1908 was 32, and the average price per gallon of water sold was 12.6 cents. In 1912 the total number of springs was 41 and the average price was 9.3 cents per gallon. About one-sixth of the total output of water (2,192,000 gallons) was used medicinally. There are resorts at 12 of the springs with accommodation for approximately 2,000 people, and the water at 6 of the reporting springs is used for bathing.

The following is the list of the springs reporting sales in 1912.

Bartlett Spring, Cambridge Springs, Crawford County.

Battering Ram Spring, Berwick, Luzerne County.

Bedford Mineral Springs, near Bedford, Bedford County.

Carnegie Alkaline and Lithia Mineral Spring, Carnegie, Allegheny County.

Chadwick Spring, Cambridge Springs, Crawford County.

Cloverdale Lithia Spring, near Newville, Cumberland County.

Cold Spring, Lotell, Lebanon County.

Colonial Spring, Valley Forge, Chester County.

Colvin White Sulphur Spring, Sulphur Springs, Bedford County.
Crystal-Cray Spring, Stoneham, Warren County.
Deprofundus Spring, Saegertown, Crawford County.
De Vita Mineral Spring, Cambridge Springs, Crawford County.
Dorney Park Spring, Dorney Park, Lehigh County.
East Mountain Lithia Spring, near Factoryville, Wyoming County.
Franklin Lithia Spring, Cambridge Springs, Crawford County.
Glenn Crystal Spring, Harbor Creek, Erie County.
Glen Summit Spring, Glen Summit Springs, Luzerne County.
Gray Mineral Spring, Cambridge Springs, Crawford County.
Harrison Valley Mineral Spring, Harrison Valley, Potter County.
Kecksburg Artesian Mineral Spring, Kecksburg, Westmoreland County.
Keystone Springs, near Taylorsville, Bucks County.
Magnesia Springs, Cambridge Springs, Crawford County.
Magnetic Mineral Spring, Sizerville, Cameron County.
Massassauga Mineral Spring, Erie, Erie County.
Mount Hickory Spring, Sharpsville, Mercer County.
Mount Laurel Spring, Temple, Berks County.
Pavilion Spring, Wernersville, Berks County.
Petticord Spring, Cambridge Springs, Crawford County.
Pocono Mineral Spring, near Wilkes-Barre, Luzerne County.
Polar Springs, Morrisville, Bucks County.
Prospect Rock Spring, Laurel, Luzerne County.
Pulaski Natural Mineral Spring, Pulaski, Lawrence County.
Puritas Spring, near Erie, Erie County.
Ross Common Spring, Ross Common, Monroe County.
Springfield Spring, Springfield Township, Delaware County.
Sylvia White Sand Spring, near Seward, Westmoreland County.
Thurston's Carbonate Spring, Meadville, Crawford County.
Tuckahoe Mineral Spring, near Northumberland, Northumberland County.
Unamis Mineral Spring, Unamis, Somerset County.
Whann Lithia Spring, Franklin, Venango County.
White House Spring, Neversink Mountain, Berks County.

MINERAL PAINTS AND MORTAR COLORS.

The production of mineral paints in Pennsylvania has been quite fully discussed in report No. 4 of this Survey, in which is described the various deposits, the methods of preparation for market, and the various products.

METALLIC PAINT.

Pennsylvania produced in 1912 almost 60 per cent. of the metallic paint of the United States. The following table gives the output in each of the several States producing metallic paints for the years 1909 to 1912.

PRODUCTION OF METALLIC PAINT, 1909-1912, BY STATES, IN SHORT TONS.

State.	1909.		1910.		1911.		1912.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Maryland,	431	$1,957	*	*	*	*	562	$1,930
New York,	2,553	25,523	†11,085	$32,208	†7,993	$28,569	†10,951	29,547
Pennsylvania,	‡8,120	105,683	8,063	91,714	7,676	100,837	8,970	107,499
Tennessee,	4,075	33,369	*3,907	26,680	*3,282	25,381	§	§
Wisconsin,	§	§	†2,057	14,916	†2,048	11,258	†2,106	9,953
Other states,‖	5,543	35,363	4,310	19,351	4,600	15,118	5,758	32,423
Total,	20,722	$201,905	29,422	$184,869	25,599	$181,163	28,347	$181,352

*Maryland is included with Tennessee.
†Principally crude iron ore sold for paint.
‡Includes a small quantity of Venetian red.
§Included in "Other States."
‖"Other States" includes in 1909: California, Michigan, Ohio, Vermont, Washington, and Wisconsin; 1910: California, Georgia, Michigan, Missouri, Washington; 1911: Georgia, Michigan, Missouri, Virginia, and Washington; 1912: Michigan, Missouri, Tennessee, Virginia, and Washington.

OCHER.

The production of Ocher in the United States in 1912 was mainly from Georgia, Pennsylvania and Vermont. Out of a total production of a value of $149,000 Pennsylvania produced $28,950, or 20 per cent. of the whole. The following table gives the value of the production of ocher for the years 1909 to 1912 in each of the several States.

PRODUCTION OF OCHER, 1909-1912, BY STATES, IN SHORT TONS.

State.	1909.		1910.		1911.		1912.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
California,	*	*	118	$1,730	*	*	*	*
Georgia,	5,838	$60,971	7,011	70,388	7,395	$69,447	10,107	$101,790
Pennsylvania,	4,137	45,472	3,642	32,254	3,013	28,101	3,300	28,950
Vermont,	492	4,726	609	5,935	*	*	531	6,246
Other states,†	1,991	14,180	331	2,138	1,295	11,917	1,331	12,203
Total,	12,458	$125,349	11,711	$112,445	11,703	$109,465	15,269	$149,289

*Included in "Other States."
†Includes, 1909: California, Iowa, and Virginia; 1910: Iowa, Kentucky, Oregon, and Tennessee; 1911: California, Iowa, Vermont, and Virginia; 1912: California, Iowa, and Virginia.

MORTAR COLORS.

The production of Mortar Colors in the United States is from New York, Pennsylvania, Maryland, Ohio and Tennessee. The total production in 1912 had a value of $87,595, of which the portion credited to Pennsylvania was $24,857. The details of the production for 1909 to 1912 are shown by the following table.

PRODUCTION OF MORTAR COLORS, 1909-1912, BY STATES, IN SHORT TONS.

State.	1909.		1910.		1911.		1912.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
New York,	5,691	$53,539	5,200	$50,000	2,518	$24,723	3,309	$29,969
Pennsylvania,	2,662	31,416	2,711	33,752	3,248	30,412	2,550	24,857
Other states,*	2,467	23,171	2,049	24,028	2,156	21,352	3,413	32,769
Total,	10,820	$108,126	9,960	$107,780	7,922	$76,517	9,272	$87,595

*Includes, 1909 and 1910: Maryland, Ohio, and Tennessee; 1911 and 1912: Maryland and Tennessee.

SLATE AND SHALE.

The total value of slate and shale ground for pigments in 1912 in the United States was $121,482, of which Pennsylvania produced over 84 per cent. The rest of the production is from New York, New Jersey, Indiana, California and Georgia.

The shales produced in Pennsylvania and used for pigments may be classed as black, yellow and red shales. Detail information regarding the deposits of each of these varieties of shales is given in the report before referred to.

The following tables gives the total of the production of each of the mineral pigments of the United States for the years 1909 to 1912, showing the quantity and value of each together with the prices per short ton for the years 1910, 1911 and 1912.

PRODUCTION OF NATURAL MINERAL PIGMENTS, 1909-1912, IN SHORT TONS.

Pigment.	1909.		1910.		1911.		1912.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Ocher,	12,458	$125,349	11,711	$112,445	11,703	$109,465	15,269	$149,289
Umber, Sienna,	1,276	33,472	1,015	26,700	1,005	26,225	805	21,975
Metallic paint,	20,722	201,905	29,422	184,869	25,599	181,163	28,347	181,352
Mortar colors,	10,820	108,126	9,960	107,780	7,922	76,517	9,272	87,595
Slate and shale, ground,	14,944	98,176	16,515	96,001	16,510	105,451	20,964	121,482
Total,	60,220	$567,028	68,623	$527,795	62,739	$498,821	74,657	$561,693

AVERAGE PRICE PER SHORT TON OF NATURAL MINERAL PIGMENTS, 1910-1912.

	1910	1911	1912
Ocher,	$9.60	$9.35	$9.78
Umber and sienna,	26.31	26.09	27.30
Metallic paint,*	6.28	7.08	6.40
Mortar color,	10.82	9.66	9.45
Slate and shale,	5.81	6.39	5.79

*Includes crude iron ore sold for paint, which accounts in part for the low value per ton.

STONE.

Pennsylvania far exceeds any other State in the value of its stone output, producing in 1911, 10.57 per cent. and in 1912, 11.68 per cent. of the entire production of the United States.

The following table gives the total value and the percentage of total production of the total output of stone in the United States in each of he several States for the years 1911 and 1912.

RANK OF STATES AND TERRITORIES IN 1911 AND 1912, ACCORDING TO VALUE OF PRODUCTION OF STONE, AND PERCENTAGE OF TOTAL PRODUCED BY EACH STATE AND TERRITORY.

1911.

Rank of State.	State or Territory.	Total value.	Percentage of total.	Rank of State.	State or Territory.	Total value.	Percentage of total.
1	Pennsylvania, ...	$8,147,505	10.57	27	Virginia, ...	$821,798	1.07
2	New York, ...	6,895,466	8.94	28	Kansas, ...	803,222	1.04
3	Vermont, ...	6,145,351	7.97	29	Oklahoma, ...	*801,879	1.04
4	Ohio, ...	5,796,829	7.52	30	Iowa, ...	736,207	.95
5	California, ...	4,676,902	6.07	31	Texas, ...	588,777	.76
6	Indiana, ...	4,413,655	5.72	32	Oregon, ...	*580,978	.75
7	Massachusetts, ...	*3,846,211	4.99	33	Arkansas, ...	*528,947	.69
8	Illinois, ...	3,467,930	4.50	34	New Mexico, ...	406,454	.53
9	Wisconsin, ...	2,375,102	3.08	35	Hawaii, ...	339,519	.44
10	Missouri, ...	2,338,585	3.03	36	South Carolina, ...	*335,617	.44
11	Maine, ...	*2,257,034	2.93	37	Nebraska, ...	*268,971	.35
12	Georgia, ...	1,967,077	2.55	38	Delaware, ...	218,234	.28
13	Minnesota, ...	1,702,525	2.21	39	Utah, ...	*215,307	.28
14	Washington, ...	1,679,872	2.18	40	Montana, ...	212,233	.28
15	Colorado, ...	*1,610,434	2.09	41	Florida.	*184,545	.24
16	New Jersey, ...	1,597,410	2.07	42	South Dakota, ...	*147,865	.19
17	Tennessee, ...	*1,499,648	1.94	43	Idaho, ...	64,250	.21
18	Kentucky, ...	*1,221,609	1.58	44	Arizona, ...	55,714	
19	Maryland, ...	*1,152,714	1.49	45	Wyoming.	40,544	
20	West Virginia, ...	1,106,012	1.43	46	Alaska, ...	*	.....
21	Connecticut, ...	*1,068,174	1.39	47	Louisiana, ...	*	.....
22	Michigan, ...	1,065,520	1.38	48	District of Columbia,	*	.....
23	New Hampshire, ...	1,017,272	1.32	49	Nevada, ...	*	.....
24	Rhode Island, ...	*957,743	1.24				
25	Alabama, ...	923,998	1.20				
26	North Carolina, ...	826,928	1.07		Total, ...	77,108,567	100.00

*To prevent disclosure of individual figures, Arkansas includes a small value for Oregon and South Dakota; Colorado for Alaska, Oregon, and Utah; Connecticut for Maine, Massachusetts, and Rhode Island; Florida for Louisiana; Maryland for District of Columbia; Massachusetts for Connecticut; Nebraska for Nevada; Oklahoma for Kentucky; and Tennessee for South Carolina.

RANK OF STATES AND TERRITORIES IN 1911 AND 1912 ACCORDING TO VALUE OF PRODUCTION OF STONE, AND PERCENTAGE OF TOTAL PRODUCED BY EACH STATE AND TERRITORY—Continued.

1912.

Rank of State.	State or Territory.	Total value.	Percentage of total	Number of plants.
1	Pennsylvania,	$9,144,214	11.68	700
2	Vermont,	6,581,203	8.41	66
3	New York,	6,415,015	8.19	255
4	Ohio,	6,197,388	7.92	245
5	Indiana,	5,091,924	6.50	131
6	California,	3,902,313	4.98	150
7	Illinois,	3,841,504	4.91	106
8	Massachusetts,	3,663,279	4.68	137
9	Missouri,	2,486,505	3.18	194
10	Wisconsin,	2,211,847	2.83	186
11	Georgia,	1,983,016	2.52	42
12	Minnesota,	1,845,746	2.26	74
13	Maine,	1,810,590	2.31	79
14	New Jersey,	1,716,829	2.19	102
15	Tennessee,	1,656,812	2.12	85
16	Connecticut,	1,467,458	1.87	65
17	Colorado,	1,420,607	1.81	47
18	New Hampshire,	1,311,488	1.67	36
19	Kentucky,	1,282,148	1.64	100
20	Michigan,	1,192,204	1.52	62
21	Washington,	1,174,047	1.50	32
22	West Virginia,	1,164,877	1.49	70
23	Maryland,	1,097,022	1.40	68
24	North Carolina,	1,054,872	1.35	42
25	Iowa,	946,436	1.21	95
26	Virginia,	877,746	1.12	63
27	Alabama,	842,300	1.08	26
28	Rhode Island,	768,067	.98	19
29	Kansas,	763,228	.97	97
30	Texas,	680,365	.87	37
31	Arkansas,	513,844	.66	20
32	Oklahoma,	429,788	.55	32
33	Nebraska,	336,189	.43	13
34	New Mexico,	335,927	.43	7
35	Oregon,	268,002	.34	22
36	South Carolina,	263,905	.34	13
37	Utah,	249,782	.32	27
38	Hawaii,	231,351	.30	9
39	Montana,	216,079	.28	18
40	Delaware,	193,074	.25	5
41	South Dakota,	162,295	.21	21
42	Alaska,	*	.....	.....
43	Florida,	*	.....	.....
44	Wyoming,	68,479	.09	10
45	Arizona,	67,124	.09	18
46	Idaho,	63,974	.08	11
47	Louisiana,	*	.....	.....
48	Nevada,	*	.....	.....
49	Other States,	†293,639	.37	11
	Total,	78,284,572	100.00	3,638

*Included in "Other States." †Includes Alaska, Florida, Louisiana, and Nevada.

In the following table is given the total value of the various kinds of stone produced in the United States for the years 1901 to 1912.

VALUE OF THE DIFFERENT KINDS OF STONE PRODUCED IN THE UNITED STATES, 1901-1912.

Year.	Granite.	Trap rock.	Sandstone.	Bluestone.	Marble.	Limestone.	Total
1901, ...	$14,266,104	$1,710,857	$6,974,199	$1,164,481	$4,965,699	$18,202,843	$47,284,183
1902, ...	16,083,475	2,181,157	9,430,958	1,163,525	5,044,182	20,895,385	54,798,682
1903, ...	15,705,793	2,732,291	9,482,802	1,779,457	5,362,686	22,372,109	57,433,141
1904, ...	17,191,479	2,823,546	8,482,162	1,791,729	6,297,835	22,178,964	58,765,715
1905, ...	17,563,139	3,074,551	8,075,149	1,931,625	7,129,071	26,025,210	63,798,748
1906, ...	18,562,806	3,736,571	7,147,439	2,021,898	7,582,938	27,327,142	66,378,794
1907, ...	18,064,708	4,594,103	6,753,762	2,117,916	7,837,685	31,737,631	71,105,805
1908, ...	18,420,080	4,282,406	5,831,231	1,762,860	7,733,920	27,682,002	65,712,499
1909, ...	19,581,597	5,133,812	6,564,052	1,446,402	6,548,905	32,070,401	71,345,199
1910, ...	20,541,967	6,452,141	6,394,832	1,535,187	6,992,779	34,603,678	76,520,584
1911, ...	21,194,228	6,739,141	5,854,395	1,876,473	7,546,718	33,897,612	77,108,567
1912, ...	20,234,041	6,640,662	5,387,848	1,505,763	7,786,458	36,729,800	78,284,572
Percentage of increase (+) or decrease (—)	—4.53	—1.46	—7.97	—19.76	+3.18	+8.36	+1.53

While Pennsylvania produces almost every variety of stone yet the greater portion of the production consists of sandstone and limestone.

In the following table is given the production of sandstone, including quartzite, bluestone and ganister, and the several purposes for which used for the years 1911 and 1912, from which it will be seen that Pennsylvania produced about one-fifth of the sandstone production of the United States, and that its output was only exceeded by that of New York.

VALUE OF PRODUCTION OF SANDSTONE (INCLUDING QUARTZITE AND BLUESTONE) IN THE UNITED STATES IN 1911 AND 1912, BY STATES AND USES.

1911.

State.	Rough building.	Dressed building.	Ganister.	Paving.	Curbing.	Flagging.	Rubble.
Alabama, ...	.....	.....	$12,700	.....	.....	.....	$14,362
Arizona, ...	$2,000	$1,300	.....	.....	.....	.....	.....
Arkansas, ...	5,375	525	.....	$80	$10,450	$253	1,953
California, ...	25,534	613	.....	.....	39,518	52,610	33,480
Colorado, ...	26,526	26,268	24,320	20,474	9,690	4,088	8,591
Idaho, ...	32,015	6,260	.....	.....	.....	.....	1,802
Illinois, ...	1,020	180	2,260	150	.....	.....	155
Indiana, ...	500	5,390	.....	.....	210	90	.....
Iowa, ...	875	162	.....	.....	19	.....	27
Kansas, ...	8,478	606	.....	980	807	876	178
Kentucky, ...	35,048	56,413	.....	.....	.....	2,160	211
Maryland, ...	3,751	.....	398	.....	.....	.....	.....
Massachusetts, ...	185,336	42,940	.....	.....	.....	.....	20,657
Michigan, ...	5,682	2,809	.....	.....	.....	.....	3,068
Minnesota, ...	5,279	31,237	.....	184,796	25,928	.....	13,073
Missouri, ...	2,800	9,804	.....	.....	.....	.....	1,792
Montana, ...	500	25,745	.....	.....	.....	.....	3,597
New Jersey, ...	60,716	45,900	.....	.....	.....	750	.....
New Mexico, ...	2,150	1,125	.....	.....	.....	.....	60
New York, ...	158,564	273,978	.....	297,670	474,345	274,125	17,210

VALUE OF PRODUCTION OF SANDSTONE (INCLUDING QUARTZITE AND BLUESTONE) IN THE UNITED STATES IN 1911 AND 1912, BY STATES AND USES—Continued.

Rank.	Rough building.	Dressed building.	Ganister.	Paving.	Curbing.	Flagging.	Rubble.
North Carolina,	375	7,700	.....	.....	.....	.....	1,985
Ohio,	125,596	341,252	3,843	1,294	381,463	320,840	8,170
Oklahoma,	4,766	.....	36	.....	.....	.....	7,654
Oregon,	138	.....	.....	1,000	.....	.....	506
Pennsylvania,	203,989	218,153	163,574	35,872	172,202	93,812	102,788
South Dakota,	18,878	29,325	.....	59,382	.....	.....	3,445
Texas,	50	1,400	.....	.....	550	.....	1,250
Utah,	13,705	22,248	.....	1,881	274	.....	3,845
Virginia,	1,000	4,500	.....	.....	.....	.....	2,550
Washington,	154	77,472	.....	78,706	.....	.....	73,968
West Virginia,	11,601	79,988	.....	.....	9,304	.....	35,128
Wisconsin,	25,605	32,492	40,548	7,541	.....	.....	11,060
Wyoming,	2,950	334	.....	.....	.....	.....	300
Total,	970,956	1,346,118	247,619	689,826	1,124,760	749,604	372,860

VALUE OF PRODUCTION OF SANDSTONE (INCLUDING QUARTZITE AND BLUESTONE) IN THE UNITED STATES IN 1911 AND 1912, BY STATES AND USES—Continued.

1911.

State.	Riprap.	Road making.	Railroad ballast.	Concrete.	Other.	Total value.
Alabama,	$16,133	.....	.....	$30,000	.....	$73,195
Arizona,	.....	$5,670	$6,000	32,130	.....	a57,100
Arkansas,	33,172	9,627	3,086	15,482	$521	85,529
California,	570	5,773	38	13,739	4,357	176,213
Colorado,	1,107	3,000	.....	11,466	143	135,673
Connecticut,	.....	.....	.....	.....	.....	(b)
Florida,	.....	.....	.....	.....	.....	(c)
Idaho,	20	.....	.....	.....	.....	40,097
Illinois,	.....	27,238	.....	.....	10	30,953
Indiana,	880	8	.....	.....	.....	7,078
Iowa,	.....	86	52,525	2,613	5	56,312
Kansas,	150	700	.....	650	350	13,774
Kentucky,	46	.....	.....	2,950	611	97,439
Maryland,	.....	230	100	3,000	2,618	10,097
Massachusetts,	7,110	65,960	.....	83,540	529	d406,072
Michigan,	1,140	.....	.....	.....	286	72,985
Minnesota,	385	23,000	7,764	904	.....	292,366
Missouri,	4,010	17	.....	350	975	19,748
Montana,	2,631	.....	.....	.....	1,964	34,437
Nebraska,	.....	.....	.....	.....	.....	(e)
New Jersey,	.....	16,736	.....	31,663	.....	155,765
New Mexico,	.....	725	.....	.....	35	4,085
New York,	80,207	16,624	19,605	568,975	181,692	f2,353,995
North Carolina,	.....	.....	.....	25	300	g10,385
Ohio,	90,317	4,598	150	38,801	18,623	1,334,947
Oklahoma,	500	.....	78,000	.....	15	90,971
Oregon,	18	.....	.....	.....	6	h1,668
Pennsylvania,	34,328	69,271	130,895	98,010	10,415	f1,333,309
South Dakota,	8,139	1,200	100	20,746	400	141,615
Tennessee,	.....	.....	.....	.....	.....	(i)
Texas,	750	.....	.....	24,000	.....	28,000
Utah,	.....	.....	.....	.....	.....	41,953
Virginia,	.....	1,560	21,250	455	.....	31,315
Washington,	71,543	.....	.....	.....	.....	301,843
West Virginia,	8,408	1,262	43,706	14,015	523	203,935
Wisconsin,	8,459	3,700	.....	14,375	650	144,430
Wyoming,	.....	.....	.....	.....	.....	3,584
Total,	370,023	256,965	359,220	1,017,889	225,028	7,730,868

a Includes Florida.
b Included in Massachusetts.
c Included in Arizona.
d Includes Connecticut.
e Included in Oregon.
f Includes bluestone.
g Includes Tennessee.
h Includes Nebraska.
i Included in North Carolina.

VALUE OF PRODUCTION OF SANDSTONE (INCLUDING QUARTZITE AND BLUESTONE) IN THE UNITED STATES IN 1911 AND 1912, BY STATES AND USES—Continued.

1912.

State.	Rough building.	Dressed building.	Ganister.	Paving	Curbing.	Flagging.	Rubble.
Alabama,	.....	.....	$45	.....	.....	.....	$4,866
Arizona,	$924	$2,700	.....	.....	.....	$200	300
Arkansas,	1,205	356	.....	$4,032	$5,905	2	4,770
California,	$4,338	3,668	.....	.....	2,845	.....	500
Colorado,	14,154	23,023	14,278	25,955	8,362	4,289	4,540
Connecticut,	.....	.....	.....	.....	.....	.....	.....
Florida,	.....	.....	.....	.....	.....	.....	.....
Georgia,	.....	.....	.....	.....	.....	.....	.....
Idaho,	11,630	2,663	.....	.....	.....	.....	40
Illinois,	644	564	2,250	.....	.....	.....	135
Indiana,	.....	.....	.....	.....	.....	.....	.....
Iowa,	818	14	.....	.....	.....	.....	104
Kansas,	5,063	.....	.....	.....	42	926	.....
Kentucky,	23,071	59,492	.....	140	.....	1,118	5,350
Maryland,	6,560	.....	5,250	2,400	.....	.....	550
Massachusetts,	70,038	76,725	.....	.....	.....	.....	.....
Michigan,	4,844	9,985	.....	.....	.....	.....	1,132
Minnesota,	7,591	52,695	.....	180,894	17,074	.....	6,339
Missouri,	1,921	4,078	.....	.....	40	100	1,375
Montana,	725	23,554	.....	.....	.....	2,144	2,777
Nebraska,	.....	.....	.....	.....	.....	.....	.....
New Jersey,	55,600	49,665	.....	925	7,670	450	2,884
New Mexico,	.....	.....	.....	.....	.....	.....	.....
New York,	74,392	300,098	.....	226,581	530,980	325,577	18,259
North Carolina,	.....	.....	.....	.....	.....	.....	.....
Ohio,	122,248	389,899	4,000	.....	337,110	278,887	28,432
Oklahoma,	1,600	17	.....	.....	.....	.....	3,717
Oregon,	.....	.....	.....	.....	.....	.....	.....
Pennsylvania,	221,467	239,424	206,728	31,634	189,696	100,339	38,442
South Dakota,	23,619	18,440	.....	29,413	.....	.....	2,669
Tennessee,	.....	.....	.....	.....	.....	.....	.....
Texas,	147	.....	.....	.....	994	.....	.....
Utah,	5,966	13,146	.....	5,500	.....	2,837	4,613
Virginia,	.....	.....	.....	.....	.....	.....	500
Washington,	.....	67,532	.....	40,201	.....	.....	1,828
West Virginia,	76,034	20,620	.....	.....	6,577	1,400	20,169
Wisconsin,	10,249	28,675	47,384	37,100	.....	.....	10,322
Wyoming,	2,049	.....	.....	.....	.....	.....	.....
Other States.*	83,417	16,599	10,000	500	1,250	2,800	35,692
Total,	860,263	1,403,926	289,935	585,275	1,108,545	721,069	200,305

*Includes Connecticut, Florida, Georgia, Indiana, Nebraska, New Mexico, North Carolina, and Tennessee.

VALUE OF PRODUCTION OF SANDSTONE (INCLUDING QUARTZITE AND BLUESTONE) IN THE UNITED STATES IN 1911 AND 1912, BY STATES AND USES—Continued.

1912.

State.	Riprap.	Crushed Stone.			Other.	Total.
		Road making.	Railroad ballast.	Concrete.		
Alabama,	$10,685	.....	.....	$12,000	.....	$27,596
Arizona,	.....	$2,250	$13,000	2,150	.....	21,524
Arkansas,	26,500	2,341	18,867	16,486	$839	80,533
California,	42	20,832	228	6,204	2,066	70,724
Colorado,	2,619	8,600	.....	1,349	.....	103,169
Connecticut,	.....	.....	.....	.....	.....	*
Florida,	.....	.....	.....	.....	.....	*
Georgia,	.....	.....	.....	.....	.....	*
Idaho,	150	.....	.....	.....	.....	13,883
Illinois,	.....	29,127	.....	.....	.....	32,720
Indiana,	.....	.....	.....	.....	.....	*
Iowa,	40	.....	.....	575	.....	1,551
Kansas,	.....	.....	.....	.....	.....	6,031
Kentucky,	2,614	21,000	.....	2,465	.....	114,650
Maryland,	1,250	.....	.....	.....	.....	15,950
Massachusetts,	1,975	33,600	.....	125,500	.....	307,838
Michigan,	140	.....	.....	.....	337	16,438
Minnesota,	540	8,935	.....	69,655	5,340	349,063
Missouri,	4,280	2,240	.....	125	845	15,004
Montana,	2,015	.....	.....	.....	2,065	33,280
Nebraska,	.....	.....	.....	.....	.....	*
New Jersey,	792	8,600	.....	37,529	3,059	166,583
New Mexico,	.....	.....	.....	.....	.....	*
New York,	5,685	9,659	1,118	131,808	27,160	1,651,317
North Carolina,	.....	.....	.....	.....	.....	*
Ohio,	90,189	3,310	5,000	36,252	16,973	1,312,300
Oklahoma,	.....	.....	.....	.....	.....	5,334
Oregon,	.....	.....	.....	.....	.....	*
Pennsylvania,	34,200	81,656	94,079	107,588	22,348	1,367,601
South Dakota,	10,491	3,600	.....	50,935	.....	139,167
Tennessee,	.....	.....	.....	.....	.....	*
Texas,	9,360	.....	.....	72,000	.....	82,501
Utah,	.....	.....	.....	.....	500	32,562
Virginia,	.....	1,450	1,800	270	.....	4,020
Washington,	234,915	.....	.....	.....	.....	344,476
West Virginia,	5,858	3,088	36,554	13,080	30	183,410
Wisconsin,	25,241	11,370	.....	9,006	5	179,352
Wyoming,	.....	.....	.....	1,681	.....	3,730
Other States,†	5,855	30,356	.....	16,916	2,914	†206,299
Total,	475,837	281,414	170,646	713,574	83,722	6,893,611

*Included in "Other States."
†Includes Connecticut, Florida, Georgia, Indiana, Nebraska, New Mexico, North Carolina, and Tennessee.

The portion of the limestone production of the United States credited to Pennsylvania in 1912 was one-sixth of the total. The following table gives the production in each of the several states together with the purposes for which used.

VALUE OF THE PRODUCTION OF LIMESTONE IN THE UNITED STATES IN 1911 AND 1912 BY STATES AND USES.

1911.

State.	Rough building.	Dressed building.	Paving.	Curbing.	Flagging.	Rubble.	Riprap.
Alabama,	$2,115	$29,652	$170	$150	.....	.....	$10,459
Arizona,	886	.....	.....	.....	.....	.....	1,400
Arkansas,	22,300	24,415	.....	.....	.....	.....	19,981
California,	283	.....	40	.....	.....	.....	.....
Colorado,	.....	.....	.....	.....	.....	.....	552
Connecticut,	.....	.....	.....	.....	.....	.....	.....
Florida,	.....	2,000	.....	.....	.....	.....	.....
Georgia,	1,404	.....	.....	.....	.....	.....	.....
Idaho,	.....	535	.....	.....	.....	$20	40
Illinois,	34,252	16,775	81,935	5,071	$2,979	191,848	28,275
Indiana,	1,082,164	1,972,903	965	76,039	5,207	19,369	12,108
Iowa,	35,048	4,302	37,924	3,250	1,017	29,061	89,410
Kansas,	61,147	30,991	47,754	4,202	250	20,167	35,515
Kentucky,	98,234	77,819	582	13,825	760	1,845	46,418
Louisiana,	.....	.....	.....	.....	.....	.....	.....
Maine,	.....	.....	.....	.....	.....	.....	.....
Maryland,	9,848	.....	73	45	75	.....	160
Massachusetts,	.....	.....	.....	.....	.....	.....	.....
Michigan,	7,526	.....	.....	.....	.....	165	380
Minnesota,	74,531	130,637	9,650	4,600	3,493	29,035	72,718
Missouri,	132,011	380,282	70,074	3,388	4,559	247,263	247,210
Montana,	5,285	.....	.....	.....	.....	.....	.....
Nebraska,	2,763	.....	16,929	4,000	500	1,645	24,536
Nevada,	.....	.....	.....	.....	.....	.....	.....
New Jersey,	341	.....	.....	.....	.....	.....	.....
New Mexico,	.....	.....	.....	.....	.....	.....	.....
New York,	110,919	25,086	6,278	5,053	167	15,523	32,517
North Carolina,	.....	.....	.....	.....	.....	.....	.....
Ohio,	73,272	4,846	4,000	2,200	.....	40,724	623,965
Oklahoma,	15,590	1,500	53,492	.....	.....	3,750	48,735
Oregon,	.....	.....	.....	.....	.....	.....	.....
Pennsylvania,	89,798	4,545	120,835	5,960	1,200	6,595	4,201
Rhode Island,	.....	.....	.....	.....	.....	.....	.....
South Carolina,	.....	.....	.....	.....	.....	.....	.....
South Dakota,	.....	.....	.....	.....	.....	200	800
Tennessee,	2,879	5,130	2,500	1,131	.....	2,669	88,423
Texas,	31,162	22	14,850	1,833	750	4,205	51,421
Utah,	24,702	750	25	.....	.....	260	19,166
Vermont,	1,610	.....	.....	.....	.....	2,500	.....
Virginia,	701	.....	226	.....	.....	.....	.....
Washington,	.....	.....	.....	.....	.....	.....	.....
West Virginia,	4,320	40	1,536	.....	.....	2,500	650
Wisconsin,	71,662	11,783	12,430	23,146	6,452	20,689	102,173
Wyoming,	100	.....	.....	.....	.....	275	55
Total,	$1,997,757	$2,724,013	$482,268	$153,893	$27,409	$640,308	$1,561,273

VALUE OF THE PRODUCTION OF LIMESTONE IN THE UNITED STATES IN 1911 AND 1912 BY STATES AND USES—Continued.

1911.

State.	Crushed Stone.			Flux.	Sugar factories.	Other.	Total.
	Road making.	Railroad ballast.	Concrete.				
Alabama,	$37,511	.....	$23,077	$458,356	.....	$308	$561,798
Arizona,	.....	.....	.....	683	$3,793	2,000	8,676
Arkansas,	.....	$7,615	61,666	.....	.....	.....	*136,007
California,	192,572	10,913	170,552	93,272	92,594	16,475	576,701
Colorado,	250	.....	.....	284,142	542,19	2,635	341,798
Connecticut,	323	.....	1,110	7,166	.....	12,441	†21,040
Florida,	72,500	16,945	3,000	.....	.....	3,075	97,520
Georgia,	.....	6,000	4,926	5,855	.....	13,447	31,632
Idaho,	.....	.....	.....	49	17,853	1,000	‡19,497
Illinois,	750,583	453,465	1,038,882	728,544	3,606	100,762	3,436,977
Indiana,	783,328	118,486	103,853	165,250	.....	66,910	4,406,577
Iowa,	39,496	162,704	267,936	660	7,110	1,977	679,895
Kansas,	142,895	275,373	164,518	.....	.....	6,636	789,448
Kentucky,	374,010	349,714	138,462	6,243	.....	16,258	1,124,170
Louisiana,	.....	.....	.....	.....	.....	.....	§
Maine,	.....	.....	.....	.....	.....	.....	¶
Maryland,	101,697	48,397	47,230	5,759	.....	5,352	218,636
Massachusetts,	.....	.....	.....	.....	.....	.....	¶
Michigan,	113,574	34,998	137,285	186,046	65,141	456,420	1,001,535
Minnesota,	63,406	27,020	175,761	570	3,000	18,494	612,915
Missouri,	399,869	176,101	435,679	24,593	11,861	46,877	2,179,767
Montana,	10,265	245	751	120,401	11,179	.....	148,126
Nebraska,	9,610	1,950	200,318	.....	1,103	100	263,459
Nevada,	.....	.....	.....	.....	.....	.....	‖
New Jersey,	11,616	10,269	10,310	91,781	.....	13,801	138,148
New Mexico,	.....	229,469	13,650	.....	.....	.....	243,119
New York,	856,279	679,861	463,753	443,522	.....	218,834	2,857,797
North Carolina,	15,578	.....	.....	5,000	.....	9,700	30,278
Ohio,	1,505,154	520,645	398,224	1,089,236	9,051	190,565	4,461,882
Oklahoma,	16,850	305,550	146,637	.....	.....	2,560	594,664
Oregon,	.....	.....	.....	.....	.....	.....	‖
Pennsylvania,	560,212	390,938	510,297	3,396,304	.....	152,160	5,243,045
Rhode Island,	.....	.....	.....	.....	.....	.....	¶
South Carolina,	.....	.....	.....	.....	.....	.....	**
South Dakota,	250	.....	5,000	.....	.....	.....	6,250
Tennessee,	406,448	90,444	80,904	109,633	.....	7,203	††798,369
Texas,	91,171	175,386	114,075	467	.....	4,947	490,289
Utah,	1,680	.....	5	114,307	6,250	1,000	168,145
Vermont,	7,775	.....	3,450	736	.....	3,631	19,702
Virginia,	42,643	126,884	40,677	143,099	.....	15,642	369,872
Washington,	.....	.....	.....	26,179	.....	6,299	32,478
West Virginia,	9,365	356,457	49,962	422,902	.....	54,345	902,077
Wisconsin,	269,945	44,143	211,157	56,453	.....	18,330	848,363
Wyoming,	.....	.....	18,383	.....	13,952	4,195	36,960
Total,	$6,886,855	$4,619,972	$5,041,530	$7,987,208	$300,717	$1,474,379	$33,897,612

*Includes Louisiana.
†Includes Maine, Massachusetts, and Rhode Island.
‡Includes Nevada and Oregon.
§Included with Arkansas.
¶Included with Connecticut.
‖Included with Idaho.
**Included with Tennessee.
††Includes South Carolina.

VALUE OF THE PRODUCTION OF LIMESTONE IN THE UNITED STATES IN 1911 AND 1912 BY STATES AND USES—Continued.

1912.

State.	Rough building.	Dressed building.	Paving.	Curbing.	Flagging.	Rubble.	Riprap.
Alabama,	.....	.....	$15,900	.....	.....	.....	$81,361
Arizona,	.....	.....	.....	.....	.....	.....	.....
Arkansas,	$5,887	$9,936	.....	.....	.....	$963	166
California,	136	.....	.....	.....	.....	.....	.....
Colorado,	.....	.....	.....	.....	.....	.....	.....
Connecticut,	.....	.....	.....	.....	.....	.....	.....
Florida,	.....	.....	.....	.....	.....	.....	.....
Georgia,	828	.....	.....	.....	.....	414	2,518
Idaho,	12	.....	.....	.....	.....	250	.....
Illinois,	15,413	19,293	53,169	$33,063	$356	187,478	58,545
Indiana,	1,329,620	2,173,267	230	75,697	1,481	21,335	11,407
Iowa,	41,979	9,930	4,600	580	50	43,247	112,698
Kansas,	46,222	29,219	15,062	1,032	982	29,188	20,997
Kentucky,	86,977	101,224	198	17,660	397	13,186	32,511
Louisiana,	.....	.....	.....	.....	.....	.....	.....
Maine,	.....	.....	.....	.....	.....	.....	.....
Maryland,	10,719	.....	.....	.....	.....	.....	.....
Massachusetts,	.....	.....	.....	.....	.....	.....	.....
Michigan,	9,997	.....	.....	.....	.....	380	75
Minnesota,	65,216	145,354	.....	245	1,971	35,096	43,751
Missouri,	139,416	310,276	26,661	6,170	2,928	203,672	289,999
Montana,	2,653	.....	.....	.....	.....	70	6
Nebraska,	418	.....	.....	.....	.....	4,088	64,824
Nevada,	.....	.....	.....	.....	.....	.....	.....
New Jersey,	625	.....	.....	.....	.....	.....	.....
New Mexico,	.....	.....	.....	.....	.....	.....	.....
New York,	112,736	27,013	.....	2,877	912	13,798	5,769
North Carolina,	.....	.....	.....	.....	.....	.....	.....
Ohio,	59,812	12,475	5,560	550	.....	37,822	242,742
Oklahoma,	8,692	27,731	360	.....	.....	1,325	22,374
Oregon,	.....	.....	.....	.....	.....	.....	.....
Pennsylvania,	141,424	1,258	149,079	1,465	.....	8,730	1,745
Rhode Island,	.....	.....	.....	.....	.....	.....	.....
South Dakota,	.....	.....	.....	.....	.....	600	621
Tennessee,	5,965	1,685	150	275	11	910	53,726
Texas,	13,144	7	6,000	1,111	.....	2,624	20,650
Utah,	23,961	1,100	.....	200	.....	150	8,932
Vermont,	2,760	.....	.....	.....	.....	50	.....
Virginia,	6,457	.....	.....	.....	.....	197	.....
Washington,	.....	.....	.....	.....	.....	.....	.....
West Virginia,	354	.....	.....	.....	.....	4,000	5,415
Wisconsin,	40,497	3,358	2,921	12,090	5,306	30,101	101,383
Wyoming,	740	.....	.....	.....	.....	.....	.....
Other states,*	150	.....	.....	.....	.....	.....	206
Total,	$2,178,870	$2,873,926	$278,930	$153,015	$14,393	$639,674	$1,182,461

*Includes Louisiana, Maine, Massachusetts, Nevada, Oregon, and Rhode Island.

VALUE OF THE PRODUCTION OF LIMESTONE IN THE UNITED STATES IN 1911 AND 1912 BY STATES AND USES—Continued.

1912.

State.	Crushed Stone.			Flux.	Sugar factories.	Other.	Total.
	Road making.	Railroad ballast.	Concrete.				
Alabama,	$54,270	$14,093	$26,235	$339,166	.....	$60	$531,085
Arizona,	.....	.....	.....	6,400	$12,450	249	19,099
Arkansas,	.....	.....	50,000	.....	.....	.....	66,952
California,	51,128	24,000	9,133	62,210	73,834	24,794	245,235
Colorado,	.....	376	.....	313,237	46,189	5,202	365,004
Connecticut,	.....	.....	1,600	1,524	.....	14,800	17,924
Florida,	27,500	15,000	8,750	.....	.....	9,274	60,524
Georgia,	7,385	6,000	11,500	6,686	.....	17,906	53,187
Idaho,	1,131	.....	.....	.....	18,398	.....	19,791
Illinois,	1,054,676	368,349	963,617	951,733	6,441	96,651	3,808,784
Indiana,	1,033,673	102,841	45,197	216,275	3,152	52,162	5,066,337
Iowa,	30,821	235,326	404,302	2,928	8,128	47,396	944,885
Kansas,	95,642	274,176	234,261	178	.....	10,238	757,197
Kentucky,	298,957	473,023	106,890	9,670	.....	20,355	1,160,148
Louisiana,	.....	.....	.....	.....	.....	.....	*
Maine,	.....	.....	.....	.....	.....	.....	*
Maryland,	88,687	83,532	36,423	8,364	.....	1,038	228,713
Massachusetts,	.....	.....	.....	.....	.....	.....	*
Michigan,	295,449	28,368	97,298	137,812	36,944	533,237	1,139,560
Minnesota,	23,410	25,642	195,545	1,235	4,400	4,785	546,650
Missouri,	260,198	387,449	641,798	38,937	7,270	59,011	2,373,725
Montana,	1,365	101	15,994	99,896	34,048	.....	154,133
Nebraska,	.....	5,985	252,043	.....	7,308	673	335,369
Nevada,	.....	.....	.....	.....	.....	.....	*
New Jersey,	19,509	21,410	9,014	122,943	.....	31,833	205,334
New Mexico,	.....	229,593	7,950	.....	.....	.....	237,543
New York,	828,682	701,932	811,187	535,159	.....	168,846	3,208,911
North Carolina,	10,294	.....	.....	.....	.....	29,570	39,864
Ohio,	1,671,990	782,486	269,015	1,698,237	12,562	91,807	4,885,088
Oklahoma,	60,862	178,440	110,035	150	.....	25	409,994
Oregon,	.....	.....	.....	.....	.....	.....	*
Pennsylvania,	490,342	285,312	407,445	4,361,677	.....	165,831	6,017,308
Rhode Island,	.....	.....	.....	.....	.....	.....	*
South Dakota,	560	.....	3,663	.....	5,184	.....	10,628
Tennessee,	268,509	114,011	127,076	88,789	.....	12,222	673,329
Texas,	52,753	49,956	349,602	33,094	.....	1,310	530,251
Utah,	.....	.....	.....	170,642	.....	3,260	208,245
Vermont,	1,875	.....	3,463	665	.....	3,831	12,644
Virginia,	56,506	115,576	41,192	130,916	.....	52,225	403,069
Washington,	2,255	.....	153	10,718	.....	7,244	20,370
West Virginia,	24,352	292,317	87,775	546,511	.....	20,713	981,467
Wisconsin,	310,151	26,726	263,626	36,219	.....	22,000	853,477
Wyoming,	703	.....	4,452	.....	58,800	54	64,749
Other states,	8,158	12,281	38,221	5,851	.....	8,360	†73,227
Total,	$7,130,843	$4,854,301	$5,634,455	$9,937,772	$335,108	$1,516,962	$36,729,800

*Included in "other states."
†Includes Louisiana, Maine, Massachusetts, Nevada, Oregon, and Rhode Island.

A large portion of the limestone produced in Pennsylvania is used for furnace flux, the production of the State for that purpose being 40 per cent. of the entire United States. In the following table is shown the production of limestone for furnace flux in each of the several States in the years 1911 and 1912.

PRODUCTION OF FURNACE FLUX, ETC., IN 1911 AND 1912, BY STATES, IN LONG TONS.

State.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Alabama,	831,864	$458,356	582,904	$339,166
Arizona,	692	683	7,035	6,400
California,	84,247	93,272	54,868	62,210
Colorado,	518,643	284,142	334,224	313,237
Connecticut,	*5,364	*7,166	2,774	1,524
Georgia,	9,838	5,855	11,622	6,636
Illinois,	1,927,785	728,544	2,747,284	951,733
Indiana,	334,471	165,250	481,950	216,275
Iowa,	1,071	660	5,500	2,928
Kansas,	.....	.....	177	178
Kentucky,	11,088	6,243	14,527	9,670
Maryland,	10,284	5,759	14,978	8,364
Massachusetts,	†	†	‡	‡
Michigan,	341,027	186,046	295,941	137,812
Minnesota,	842	570	1,257	1,235
Missouri,	27,618	24,593	42,533	33,937
Montana,	228,147	120,401	259,193	99,896
New Jersey,	183,267	91,781	230,822	122,943
New York,	781,247	443,522	981,670	535,159
North Carolina,	10,000	5,000	.....	.....
Ohio,	2,335,048	1,089,236	3,334,126	1,698,237
Oklahoma,	.....	.....	100	150
Oregon,	84	49	‡	‡
Pennsylvania,	6,769,942	3,396,304	8,540,211	4,361,677
Rhode Island,	†	†	‡	‡
South Carolina,	§	§	.....	.....
Tennessee,	¶198,050	¶109,633	156,732	88,789
Texas,	504	467	48,161	33,094
Utah,	194,659	114,307	295,670	170,642
Vermont,	536	736	604	665
Virginia,	231,968	143,099	254,108	130,916
Washington,	28,396	26,179	17,484	10,718
West Virginia,	886,268	422,902	1,179,708	546,511
Wisconsin,	123,693	56,453	83,840	36,219
Other states,	.....	.....	‖10,551	‖5,851
Total,	16,126,650	$7,987,208	20,190,554	$9,937,772
Average price,	.....	$0.50	.....	$0.49
Per cent. of increase,	.....	.....	25.20	24.42

*Includes Massachusetts and Rhode Island.
†Included with Connecticut.
‡Included in "other states."
§Included in Tennessee.
¶Includes South Carolina.
‖Includes Massachusetts, Oregon, and Rhode Island.

The increase in the the use of crushed stone for all purposes is most marked, and in the following table is shown the amount and value of stone produced and used in road making, railroad ballast and concrete, in each of the several States for the years 1911 and 1912. This table includes all kinds of stone which are used for these purposes.

PRODUCTION OF CRUSHED STONE IN 1911 AND 1912, BY STATES AND TERRITORIES, AND BY USES, IN SHORT TONS.

1911.

State or Territory.	Road Making.		Railroad Ballast.		Concrete.		Total.	
	Quantity	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Alabama,	64,703	$37.511	.....	.....	155,748	$103.077	220,451	$140,588
Arizona,	.....	.....	7,500	$6,000	10,000	10,000	17,500	16,000
Arkansas.	24,887	16,627	193,334	153,090	116,763	101,482	334,984	271,199
California,	1,878,120	1,259,123	762,858	460,419	1,674,211	1,151,595	4,315,189	2,871,137
Colorado.	16,381	21,014	.....	.....	20,259	13,466	36.640	34,480
Connecticut,	442,214	263,782	107,226	50,346	475,010	200,642	1,024,450	514,770
Delaware,	15,956	12,465	44,465	31,125	38,011	35,609	98,432	79,199
Florida.	158,625	78.170	42,363	16,945	29,375	35.130	230,363	130,245
Georgia,	30,265	31,363	45,756	42,615	168,446	148.767	244,467	222.748
Hawaii,	42.242	47.577	9.040	8,625	95,694	134,503	146,976	190,705
Illinois,	1,394.298	777,821	952,108	453.465	1,990,382	1,038,882	4,536,788	2,270,168
Indiana.	1,424,110	783,336	317,455	118.486	180,159	103,853	1,921,724	1,005,680
Iowa.	56,404	39,582	488.150	215,229	416,211	270,549	960,770	525,360
Kansas,	232,399	143.595	584.395	275,373	219,090	165,168	1.035.884	584,136
Kentucky,	551,399	374.010	784,021	349,714	230,995	141,412	1,566.415	865,136
Louisiana,	.....	.....	9,700	7.615	27,600	21,666	37,300	29,281
Maine,	1,386	1.524	11,358	9,180	20,656	16,242	33,400	26,946
Maryland,	552,425	375,855	333,453	185.158	203,396	165,696	1.089,274	726,709
Massachusetts,	588,648	526,590	17,448	13,048	816,330	573,571	1,422,426	1,113.209
Michigan,	237,307	126,145	91,713	34,998	351,635	175,714	680,655	336.857
Minnesota.	137,546	114,187	71.772	45,230	222,423	193,324	431,741	352.741
Missouri,	515,382	411,831	296,099	176,101	579,942	459.319	1,391,423	1,047,251
Montana,	14,681	10,265	490	245	2,291	751	17,462	11.261
Nebraska.	12,040	9,610	2,500	1,950	226,205	200,318	240,745	211,878
New Hampshire,	2,000	1,350	1,392	1,306	21,329	14,312	24,721	16,968
New Jersey,	958,907	760,736	384,305	240,308	434,032	316,009	1,777.244	1.317,053
New Mexico,	500	725	803,086	388,119	27,806	13,650	831.392	402,494
New York,	2,735,105	1,664,897	1,590,242	753,966	1,983,097	1,294,978	6,308,444	3.713.841
North Carolina,	63,169	61,493	59,514	26,808	82,549	77,154	205.232	165,455
Ohio,	3,212.152	1,509,762	1,244,508	520,795	927,106	437,025	5,383,766	2,467,572
Oklahoma,	21,950	16,850	682,523	383,550	243,557	146,637	948,030	547,037
Oregon.	538,292	434,001	.....	.....	80,839	87,899	619.131	521.900
Pennsylvania,	1,628,923	1,006,014	1,534,424	843.166	1,324,782	792.440	4,488,129	2.641,620
Rhode Island,	25,028	33,616	.....	.....	16,054	20,496	41.082	54,112
South Carolina.	18,839	18,039	2,416	1,045	125,265	129,950	146,520	159,034
South Dakota,	2,275	1,450	400	100	32,389	25,746	35,064	27.296
Tennessee,	519,688	406,448	210,534	90.444	148,698	80,904	878,920	577,796

Texas,	124,240	91,171	406,881	175,386	181,888	151,633	713,009	418,190
Utah,	4,480	1,680	.....	.....	20	5	4,500	1,685
Vermont,	13,500	8,952	.....	.....	12,810	9,020	26,310	17,972
Virginia,	109,963	83,582	609,049	293,856	212,292	146,077	931,304	523,515
Washington,	229,193	138,183	2,755	1,874	1,330	2,378	233,278	142,435
West Virginia,	14,483	10,627	835,979	400,163	109,627	63,977	960,089	474,767
Wisconsin,	611,988	336,773	99,836	44,143	540,649	268,650	1,252,473	649,566
Wyoming,	.....	.....	.....	.....	22,840	18,383	22,840	18,383
Total,	19,426,098	$12,048,325	13,641,048	$6,819,986	14,799,791	$9,558,064	$47,866,937	$28,426,375

PRODUCTION OF CRUSHED STONE IN 1911 AND 1912, BY STATES AND TERRITORIES, AND BY USES, IN SHORT TONS—Continued.

1912.

State and Territory.	Road Making.		Railroad Ballast.		Concrete.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Alabama.	85,754	$54.270	30,298	$14,093	65,144	$38.235	181,196	$106,598
Arizona,	1,875	2,250	14,950	13,000	11,703	20,956	28,528	36,206
Arkansas,	129,577	104,258	177,295	115,725	125,236	107.605	432,108	327.588
California,	1.451,487	964,300	948.046	548,578	1,157,665	808,847	3,557,198	2,321,725
Colorado,	14,860	15,350	1,222	376	2,945	3,149	19,027	18,875
Connecticut.	441,828	288,548	211,460	89,645	314,605	194,119	967.893	572,312
Delaware.	30,614	27,861	20,100	14,070	29,533	24,536	80,247	66,467
Florida,	84,224	57,836	43,500	15,000	23.514	25,646	151,238	98,482
Georgia,	35,621	33,927	42,695	53,223	206,818	199.754	285.134	286.904
Hawaii,	105,147	128,854	.....	.....	75,595	94,140	180,742	222.994
Idaho,	14,978	10,131	25,000	16,000	5,750	4,600	45,728	30.731
Illinois,	2.643,251	1,083,803	960.602	363,349	2,035,113	963,617	5,638,966	2,415,769
Indiana.	1,771,521	1,033,673	286,136	102,841	72.603	45,197	2.130,310	1,181,711
Iowa,	37,567	30,321	601,137	235,326	422,332	404,877	1.061,036	671,024
Kansas,	126,078	95,642	560,322	274,176	317.112	234.261	1,003,512	604,079
Kentucky,	514.124	319,057	1,024,538	473,023	200,209	109,355	1,738,871	901,435
Louisiana,	10,197	8,158	15,351	12,281	47,776	38,221	73.324	58,660
Maine,	7,030	5,062	18,666	14,000	6.627	5,075	32,393	24,137
Maryland,	489,921	360,726	383,371	212,879	144.634	133.674	1,017,926	707,279
Massachusetts,	460,564	431,162	14.651	13,985	934,432	741.835	1.409,647	1,186,982
Michigan.	625,358	313,815	54.327	28,368	196,778	106,638	876,463	448,821
Minnesota,	76,783	65,952	59,905	40.642	328,445	287,600	465,133	394,194
Missouri,	333,591	262,438	599,799	387,449	837.096	674,986	1.770,486	1,324,873
Montana,	4,141	1,365	184	101	30,593	18,115	34,918	19,581
Nebraska,	40	20	9,037	5.985	275,430	252,063	284,507	253,068
New Hampshire,	5,270	2,875	2,022	2,527	24,178	20,228	31,470	25,630
New Jersey,	855,537	679,768	417,482	266,136	515,311	395,142	1,788,330	1,341,046
New Mexico,	.....	.....	710,149	326,022	15,325	7,950	725,474	333.972
New York,	1,978,666	1,256,354	1,441,326	742,156	2.333,612	1,466.316	5,753,604	3,464.826
North Carolina,	76,716	70,985	116,664	33,254	209,265	206,579	402,675	310,818
Ohio,	3,595,221	1,675.300	2,093,441	787.436	600,729	305,267	6.289,391	2,768,053
Oklahoma,	89.413	60,862	340,936	178,440	183,680	111,435	614.029	350.737
Oregon,	150,587	128,272	28,028	14,636	176,070	102,013	354.685	244,921
Pennsylvania,	1,506,457	948,364	1,249,713	723,476	1,205,257	754,231	3,961,427	2,426,071
Rhode Island,	58,577	64,777	.....	.....	19,508	24,140	78,085	88,917
South Carolina,	40,719	41,252	22,926	21,234	68,035	67,878	131,680	130.364
South Dakota,	3.875	4,160	.....	.....	67.671	54,598	71.546	58,758

Tennessee,	325,964	268,609	267,267	114,011	214,007	127,076	807,238	609,696
Texas,	79,694	62,753	110,212	49,966	633,301	434,332	823,207	537,041
Vermont,	2,700	1,975	5,000	2,000	21,396	15,007	29,096	18,982
Virginia,	140,697	112,496	300,240	166,856	222,684	156,889	663,621	436,241
Washington,	166,926	96,775	5,645	2,847	40,659	29,591	213,230	129,213
West Virginia,	40,933	27,440	700,669	328,871	234,883	100,855	976,490	457,166
Wisconsin,	755,795	370,559	75,983	26,726	612,741	335,568	1,444,519	732,853
Wyoming,	452	703	.....	.....	5,731	6,133	6,133	6,836
Total,	19,370,425	$11,663,458	13,990,345	$6,835,749	15,271,731	$10,258,329	48,632,601	$28,657,636

The stones which are crushed and used in that shape can be classed as granite, trap-rock, limestone and sandstone, and the following table shows the amount of each class of rock crushed and the purposes for which used during the years 1911 and 1912. It is to be noted that there was but little change in price during these two years.

QUANTITY AND VALUE OF CRUSHED STONE PRODUCED IN THE UNITED STATES IN 1911 AND 1912, BY KINDS AND USES, IN SHORT TONS.

1911.

Kind.	Road Making.		Railroad Ballast.		Concrete.		Total.		Average price per ton.
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
Granite,	2,569,256	$1,836,171	1,644,808	$896,774	1,810,953	$1,442,847	6,025,017	$4,175,792	$0.69
Trap rock,	4,436,800	3,068,334	1,555,032	944,020	3,102,306	2,055,798	9,094,138	6,068,152	.67
Limestone,	12,075,515	6,886,855	9,708,418	4,619,972	8,664,508	5,041,530	30,448,441	16,548,357	.54
Sandstone,	344,527	256,965	732,790	359,220	1,222,024	1,017,889	2,299,341	1,634,074	.71
Total,	19,426,098	$12,048,325	13,641,048	$6,819,986	14,799,791	$9,558,064	47,866,937	$28,426,375	.....
Average price,	.....	$0.62	.....	$0.50	.....	$0.65	.....	$0.59	.....

1912.

Granite,	1,946,354	$1,482,924	1,394,658	$815,337	1,892,213	$1,569,979	5,233,225	$3,868,240	$0.74
Trap rock,	3,653,356	2,668,227	1,721,293	995,465	3,333,865	2,340,321	8,708,514	6,004,063	.69
Limestone,	13,292,935	7,130,843	10,560,779	4,854,301	9,268,928	5,634,456	33,122,642	17,619,599	.53
Sandstone,	477,780	281,414	313,515	170,646	776,725	713,574	1,568,020	1,165,634	.74
Total,	19,370,425	$11,563,458	13,990,345	$6,835,749	15,271,731	$10,258,329	48,632,501	$28,657,536	.....
Average price,	.....	$0.60	.....	$0.49	.....	$0.67	.....	$0.59	.....

The production of trap rock in the United States is from California, Connecticut, Hawaii, Massachusetts, Michigan, New Jersey, New York and Pennsylvania. The greatest production in 1912 was from California, which was followed by New Jersey. Pennsylvania ranks third in the value of its production of trap in 1912 and ranked fourth in 1911. The details of the production of trap rock and its uses in each of the several states is given in the following table.

VALUE OF TRAP ROCK PRODUCED IN THE UNITED STATES IN 1911 AND 1912, BY STATES AND USES.

1911.

State.	Building.	Paving.	Crushed Stone.			Other.	Total.
			Road making.	Railroad ballast.	Concrete.		
California,	$4,077	$166,242	$699,543	$311,019	$688,926	$186,123	$2,055,930
Connecticut,	8,402	2,695	220,180	50,346	187,234	3,604	472,461
Hawaii,	1,500	.....	47,577	8,625	134,503	147,314	339,519
Massachusetts,	13,825	.....	384,115	12,178	442,113	6,839	859,070
Northern Michigan,	.....	.....	12,571	.....	38,429	.....	51,000
New Jersey,	6,154	26,441	646,209	177,019	271,204	9,359	1,136,385
New York,	22,250	.....	704,566	63,500	133,650	36,000	959,966
Pennsylvania,	27,122	2,100	353,573	321,333	159,740	942	864,810
Total,	$83,330	$197,478	$3,068,334	$944,020	$2,055,798	$390,181	$6,739,141

1912.

California,	$500	$229,261	$591,036	$340,561	$543,254	$221,735	$1,926,347
Connecticut,	15,683	3,081	274,036	89,645	180,370	18,255	581,070
Hawaii,	2,707	.....	128,854	.....	94,140	5,650	231,351
Massachusetts,	30,614	.....	303,007	10,000	564,706	6,914	915,241
Michigan,	.....	.....	18,366	.....	9,340	8,500	36,206
New Jersey,	9,213	31,646	616,674	189,641	342,079	13,144	1,202,397
New York,	20,000	.....	376,460	39,106	396,101	.....	831,667
Pennsylvania,	14,458	1,347	359,844	326,512	210,331	3,391	916,383
Total,	$93,175	$265,335	$2,668,277	$995,465	$2,340,321	$278,089	$6,640,662

PRODUCTION BY COUNTIES.

It is fully realized that in presenting this brief statement of the mineral production in the several counties of the State that the same is far from perfect, and that the figures in some cases are but estimates, no data being available which would give the actual output of some of the products. It is also impossible in a number of cases to give the output of certain products without disclosing individual production. It is believed, however, that the statement of the output of each of the counties of the State will be of interest

even where the figures are partially estimated, or where they must be combined with other products for the reason above stated.

The greatest error in the production in any of the counties is in the case of natural gas, where it has thus far been impracticable to obtain the amount and value of the gas produced in each of the counties, and therefore some system must be used to estimate the value of this product. It is fully realized that the method used has resulted in some cases in estimated values which vary considerably from the true amount, if the same could have been secured, but a uniform method of dividing the total production of natural gas where it could not be distributed to the proper counties was used uniformly in all cases.

ADAMS COUNTY

The total mineral production of Adams County in 1912 had a value of $209,689. Of this amount over one-half was represented by brick and tile, which reached a value of $108,959. The other products were feldspar, quartz, trap rock, limestone and lime, which represented a combined output of $100,730.

ALLEGHENY COUNTY.

The total production of Allegheny County in 1912 had a value of $29,396,719. The following table gives the value of the several products so far as it has been possible to publish the same without disclosing individual production.

MINERAL PRODUCTION OF ALLEGHENY COUNTY, 1912.

Product.	Quantity.	Value.
Brick and tile,	.....	$1,707,269
Bituminous coal, short tons,	18,867,265	20,528,181
Sand and gravel, short tons,	2,844,003	890,011
Sandstone,	.....	72,388
Petroleum, barrels (42 gallons),	861,652	1,353,927
Miscellaneous,*	.....	4,844,943
Total,	.....	$29,396,719

*Includes clay, abrasives, mineral plants, salt, cement, limestone, mineral waters, natural gas (partly estimated).

ARMSTRONG COUNTY.

The value of the mineral production of Armstrong County in 1912 was $6,948,186. Much the greater portion of this was bituminous coal, of which 4,104,989 short tons were mined, of a value at the mines of $4,054,301.

The following table gives the value of the several products except where individual production would be disclosed.

MINERAL PRODUCTION OF ARMSTRONG COUNTY, 1912.

Product.	Quantity.	Value.
Brick and tile,	.....	$1,089,067
Bituminous coal, short tons,	4,104,989	4,054,301
Sand and gravel, short tons,	185,313	147,145
Limestone,	.....	287,156
Lime, short tons,	2,309	6,774
Petroleum, barrels (42 gallons),	36,107	56,323
Miscellaneous,*	.....	1,307,420
Total,	.....	$6,948,186

*Includes clay, pottery, sandstone, natural gas (partly estimated).

BEAVER COUNTY.

In 1912 the value of the mineral production in Beaver County was $2,686,944. The following table gives the value of the several products produced in this county.

MINERAL PRODUCTION OF BEAVER COUNTY, 1912.

Product.	Quantity.	Value.
Brick and tile,	.....	$1,202,140
Clay,	.....	40,402
Bituminous coal, short tons,	247,465	309,304
Sand and gravel, short tons,	290,360	96,079
Pottery,	.....	408,842
Petroleum, barrels (42 gallons),	114,526	181,567
Natural gas,*	.....	200,000
Quarry products,	.....	48,610
Total,	.....	$2,686,944

*Partly estimated.

BEDFORD COUNTY.

The total value of the mineral production of Bedford County in 1912 was $991,550, 80 per cent. of which was represented by the value of bituminous coal produced. The following table gives in detail the value of the several products.

MINERAL PRODUCTION OF BEDFORD COUNTY, 1912.

Product.	Value.
Brick and tile and clay,	$109,550
Coal, bituminous,	795,031
Mineral waters,	10,325
Lime, limestone, sandstone, sand and gravel,	76,635
Total,	$991,550

BERKS COUNTY.

In 1912 the mineral production of Berks County had a value of $1,203,937, almost one-half of which was represented by the value of the trap rock quarried.

In the following table will be found the value of the several products except in such cases as might disclose individual production.

MINERAL PRODUCTION OF BERKS COUNTY, 1912.

Product.	Quantity.	Value.
Mineral paints,	.....	$39,872
Clay,	.....	37,786
Brick and tile,	.....	360,464
Sand and gravel, short tons,	84,379	70,327
Trap rock,	.....	529,320
Limestone,	.....	84,450
Lime, short tons,	25,546	58,919
Miscellaneous,*	.....	22,799
Total,	.....	$1,203,937

*Includes iron ore, granite, sandstone, mineral waters.

BLAIR COUNTY.

The total mineral production of Blair County in 1912 was $1,879,809, over 60 per cent. of which was represented by limestone.

The following table gives the quantity and value of the several products produced in this county.

MINERAL PRODUCTION OF BLAIR COUNTY, 1912.

Product.	Quantity.	Value.
Bituminous coal, short tons,	324,336	$378,511
Sandstone,	.....	39,597
Limestone,	.....	1,149,091
Lime, short tons,	18,353	57,266
Miscellaneous,*	.....	255,344
Total,	.....	$1,879,809

*Includes clay, brick and tile, sand and gravel, iron ore.

BRADFORD COUNTY.

The only reported mineral production from Bradford County in 1912 was a small output of bluestone. It is impossible to give the details of the production without disclosing the individual output.

BUCKS COUNTY.

Over one-half of the mineral production of Bucks County in 1912 was represented by the brick and tile.

The following table gives the value of the several products except where necessary to combine the same to avoid disclosure of individual production.

MINERAL PRODUCTION OF BUCKS COUNTY, 1912.

Product.	Value.
Brick and tile,	$207,872
Granite,	2,723
Trap rock,	101,386
Sandstone,	32,833
Miscellaneous,*	46,617
Total,	$391,431

*Includes clay, sand and gravel, pottery, bluestone, limestone mineral waters.

BUTLER COUNTY.

The mineral production of Butler County in 1912 had a total value of $6,491,261. The leading product continued to be petroleum, which was somewhat closely followed by bituminous coal.

The following table gives the quantity and value of the several products. It is probable that under the method adopted the value of the natural gas is in excess of the amount actually produced.

MINERAL PRODUCTION OF BUTLER COUNTY, 1912.

Product.	Quantity.	Value.
Brick and tile,	.....	$122,909
Bituminous coal, short tons,	1,000,947	1,131,503
Limestone,	.....	539,097
Lime, short tons,	23,156	67,636
Petroleum, barrels (42 gallons).	1,210,330	1,983,045
Miscellaneous,*	.....	2,647,071
Total,	.....	$6,491,261

*Includes sand and gravel, sandstone, natural gas.

CAMBRIA COUNTY.

The total mineral production of Cambria County in 1912 had a value of $20,502,069, almost 95 per cent. of which was represented by bituminous coal. The production of bituminous coal reached 17,585,130 short tons, with a total value at the mines of $19,200,298. The other products were brick and tile, clay and sandstone, with a combined value of $1,301,771.

CAMERON COUNTY.

The total mineral production of Cameron County in 1912 was $70,631. Most of the production was represented by bituminous coal, of which 47,029 tons were mined with a value of $56,843. The other products were brick and tile and mineral waters.

CARBON COUNTY.

The mineral production of Carbon County in 1912 had a total value of $6,111,610. Of this amount anthracite coal represented over 98 per cent., there being 2,568,305 gross tons mined, with a total value at the mines of $5,998,394. The other products reported were mineral paints, brick and tile, sand and gravel, and limestone.

CENTRE COUNTY.

The total value of the mineral production of Centre County for 1912 was $2,189,908. Almost 60 per cent. of the total was represented by the bituminous coal mined.

The following table gives the several products and the value of each as reported to the Survey.

MINERAL PRODUCTION OF CENTRE COUNTY, 1912.

Product.	Quantity.	Value.
Brick and tile,	.....	$363,848
Clay,	.....	31,951
Bituminous coal, short tons,	1,291,374	1,292,301
Limestone,	.....	147,479
Lime,	100,987	332,430
Miscellaneous,*	.....	21,899
Total,	.....	$2,189,908

*Includes sand and gravel, iron ore, sandstone.

CHESTER COUNTY.

Chester County had a total mineral production in 1912 of $1,407,202. The following table gives the value of each of these products except in cases where it might disclose individual production.

MINERAL PRODUCTION OF CHESTER COUNTY, 1912.

Product.	Value.
Brick and tile,	$202,863
Feldspar and quartz,	87,267
Limestone,	163,038
Lime,	613,250
Quarry products,*	271,750
Miscellaneous,†	69,034
Total,	$1,407,202

*Includes iron ore, graphite, granite, trap rock, marble, sandstone.
†Includes clay, sand and gravel, pottery, mineral waters.

CLARION COUNTY.

The total mineral production of 1912 in Clarion County had a value of $2,990,682. The following table gives in detail the quantity and value of the several products.

MINERAL PRODUCTION OF CLARION COUNTY, 1912.

Product.	Quantity.	Value.
Brick and tile,	.....	$226,489
Clay,	.....	23,584
Bituminous coal, short tons,	1,199,322	1,223,537
Petroleum, barrels (42 gallons),	290,389	469,480
Miscellaneous,*	.....	1,047,592
Total,	.....	$2,990,682

*Includes sand and gravel, pottery, limestone, lime, natural gas.

CLEARFIELD COUNTY.

The total value of the mineral production of Clearfield County in 1912 was $10,691,481. The following table gives the several products reported to the Survey, together with the value of each.

MINERAL PRODUCTION OF CLEARFIELD COUNTY, 1912.

Product.	Quantity.	Value.
Brick and tile,	.....	$2,250,983
Bituminous coal, short tons,	7,938,337	8,230,763
Clay, sand and gravel, sandstone,	.....	209,735
Total,	.....	$10,691,481

CLINTON COUNTY.

The total value of the mineral production of Clinton County in 1912 was $1,413,229, over one-half of which was represented by brick and tile.

The following table gives the value of the several products of this county.

MINERAL PRODUCTION OF CLINTON COUNTY, 1912.

Product.	Value.
Brick and tile,	$873,741
Clay,	50,936
Bituminous coal,	427,192
Other products,*	61,360
Total,	$1,413,229

*Includes mineral paints, sand and gravel, sandstone, bluestone, limestone and lime.

COLUMBIA COUNTY.

The total mineral production of Columbia County in 1912 had a value of $2,589,221. Of this amount about 97 per cent. was anthracite coal, of which 1,087,776 gross tons were mined, of a total value at the mines of $2,510,330. The other products reported were brick and tile, sand and gravel, pottery, limestone, lime and mineral waters, which combined had a value of $78,891.

CRAWFORD COUNTY.

In 1912 the mineral production of Crawford County had a value of $107,425. This consisted of sand and gravel, sandstone, mineral waters, petroleum and natural gas. Of this total over one-fourth was represented by the value of mineral waters. There were 41,398 barrels of petroleum produced, with a value of $63,673.

CUMBERLAND COUNTY.

The total value of the mineral production of Cumberland County in 1912 was $215,397, of which over one-half was represented by the value of the clay mined.

The following table shows the value of the several products reported.

MINERAL PRODUCTION OF CUMBERLAND COUNTY, 1912.

Product.	Value.
Clay,	$135,158
Sand and gravel,	7,858
Limestone,	17,050
Lime,	26,230
Miscellaneous,*	29,101
Total,	$215,397

*Includes brick and tile and mineral waters.

DAUPHIN COUNTY.

The mineral production of Dauphin County in 1912 had a value of $2,557,242, of which almost 80 per cent. was represented by the output of anthracite coal.

The following table gives the value of the several products reported from this county.

MINERAL PRODUCTION OF DAUPHIN COUNTY, 1912.

Product.	Quantity.	Value.
Anthracite coal, short tons,	889,336	$2,001,018
Sand and gravel, short tons,	36,446	30,523
Limestone,	.....	158,735
Lime,	25,134	70,612
Miscellaneous,*	.....	296,344
Total,	.....	$2,557,242

*Includes brick and tile, sand lime brick, trap rock, and sandstone.

DELAWARE COUNTY.

The mineral production of Delaware County in 1912 reached a value of $663,841, of which brick and tile represented almost one-half.

The following table shows the value of the several products reported from this county.

MINERAL PRODUCTION OF DELAWARE COUNTY, 1912.

Product.	Value.
Brick and tile,	$294,962
Granite,	184,248
Trap rock,	150,713
Miscellaneous,*	33,918
Total,	$663,841

*Includes sand and gravel, feldspar and quartz, sandstone, and mineral waters.

ELK COUNTY.

The mineral production of Elk County in 1912 had a value of $2,656,992, almost one-half of which was represented by bituminous coal.

The following table shows the quantity and value of tbe several products reported from this county.

MINERAL PRODUCTION OF ELK COUNTY, 1912.

Product.	Quantity.	Value.
Brick and tile,	.....	$998,308
Bituminous coal, short tons,	1,146,496	1,132,363
Petroleum, barrels (42 gallons),	158,297	237,539
Miscellaneous,*	.....	288,782
Total,	.....	$2,656,992

*Includes clay, sand and gravel, sandstone.

ERIE COUNTY.

Erie County in 1912 had a mineral production of $356,542. The largest individual item was brick and tile, with a total value of $155,036, followed by sand and gravel, with a value of $107,298. The other products reported were mineral waters and natural gas, with a combined total output (natural gas partly estimated) of $94,208.

FAYETTE COUNTY.

The mineral production of Fayette County in 1912 had a total value of $33,507,923.

The following table gives the quantity and value of the several products, from which it will be seen that the bituminous coal represents about 97 per cent. of the total.

MINERAL PRODUCTION OF FAYETTE COUNTY, 1912.

Product.	Quantity.	Value.
Brick and tile,	.....	$615,875
Bituminous coal, short tons,	32,366,567	32,595,749
Sand and gravel, short tons,	123,811	90,268
Sandstone,	.....	11,887
Limestone,	.....	100,634
Miscellaneous,*	.....	93,510
Total,	.....	$33,507,923

*Includes clay, pottery, bluestone, natural gas.

FOREST COUNTY.

The only mineral production for 1912 in Forest County consisted of petroleum and natural gas. Of the former there was a production of 184,169 barrels, with a value of $302,480. Natural gas was produced to an estimated value of $227,000.

FRANKLIN COUNTY.

The mineral production of Franklin County in 1912 had a value of $43,974. The largest individual item was sand and gravel, which was almost one-half of the total amount. The other products were brick and tile, limestone and lime.

FULTON COUNTY.

The only mineral productions of Fulton County in 1912 were bituminous coal, limestone and lime. Owing to the small number of producers it is impossible to give the details of production without disclosing individual values.

GREENE COUNTY.

Greene County had a total mineral production in 1912 of $6,381,020. The products reported were petroleum, brick and tile, bituminous coal, natural gas, sandstone and limestone.

HUNTINGDON COUNTY.

Mineral products were reported from Huntingdon County in 1912 with a total value of $2,824,328. The largest individual item was brick and tile, with a value of $1,146,396, closely followed by bituminous coal, of which 834,914 short tons were mined, with a value of $1,025,646.

The following table gives the quantity and value of the several products reported.

MINERAL PRODUCTION OF HUNTINGDON COUNTY, 1912.

Product.	Quantity.	Value.
Brick and tile,	.....	$1,146,396
Bituminous coal, short tons,	834,914	1,025,646
Sand and gravel, short tons,	254,336	291,484
Sandstone,	.....	136,159
Lime, short tons,	19,241	54,873
Miscellaneous,*	.....	169,770
Total,	.....	$2,824,328

*Includes clay, pottery, iron ore and limestone.

INDIANA COUNTY.

The mineral production of Indiana County in 1912 had a value of $9,021,649. Of this amount about 98 per cent. was bituminous coal, of which 9,174,927 short tons were mined, with a total value of $8,872,019. The other products reported were brick and tile, clay, limestone and lime, with a total combined value of $149,630.

JEFFERSON COUNTY.

In 1912 the total mineral production of Jefferson County had a value of $6,430,074, of which about 80 per cent. was represented by bituminous coal.

The following table shows the quantity and value of the several products except where individual production might be disclosed.

MINERAL PRODUCTION OF JEFFERSON COUNTY, 1912.

Product.	Quantity.	Value.
Brick and tile,	.....	$193,835
Bituminous coal, short tons,	5,416,536	5,168,998
Petroleum, barrels (42 gallons),	36,616	58,787
Miscellaneous,*	.....	1,008,454
Total,	.....	$6,430,074

*Includes sand and gravel, sandstone, limestone, lime and natural gas.

JUNIATA COUNTY.

The mineral production of Juniata County in 1912 had a value of $9,031. The largest product was lime, followed by brick and tile and limestone in the order named. Owing to the few producers it is impossible to give the detail production without disclosing individual output.

LACKAWANNA COUNTY.

The mineral production of Lackawanna County in 1912 had a value of $43,722,632. Almost the entire production was represented by anthracite coal, of which was produced 19,283,814 gross tons, of a value at the mines of $43,602,138. The other products reported were brick and tile, sand and gravel, sand lime brick, and sandstone, with a combined value of $120,494.

LANCASTER COUNTY.

The total mineral production of Lancaster County in 1912 had a total value of $687,968.

The following table gives the value of the several products except where individual production might be disclosed.

MINERAL PRODUCTION OF LANCASTER COUNTY, 1912.

Product.	Value.
Brick and tile,	$130,473
Sand and gravel,	44,083
Limestone,	205,157
Lime,	287,938
Miscellaneous,*	20,317
Total,	$687,968

*Includes abrasives, clay, pottery, trap rock and slate.

LAWRENCE COUNTY.

The mineral production of Lawrence County in 1912 had a value of $4,652,084. The largest individual items were cement and limestone, which together represented about three-fourths of the total.

The following table gives the quantity and value of the several products reported.

MINERAL PRODUCTION OF LAWRENCE COUNTY, 1912.

Product.	Quantity.	Value.
Brick and tile,	.....	$581,862
Bituminous coal, short tons,	75,823	94,124
Sand and gravel, short tons,	43,856	19,259
Sandstone,	.....	81,663
Cement, barrels,	2,511,777	1,938,862
Limestone,	.....	1,615,210
Lime, short tons,	12,305	41,947
Petroleum, barrels (42 gallons),	33,591	54,679
Miscellaneous,*	.....	224,478
Total,	.....	$4,652,084

*Includes mineral paints, clay, pottery and natural gas.

LEBANON COUNTY.

The total mineral output of Lebanon County in 1912 had a value of $821,452. The mineral reported include brick and tile, sand and gravel, iron ore, sand lime brick, sandstone, limestone, lime and mineral waters.

The production of lime and limestone amounted to $426,114, over 50 per cent. of the total, and the value of brick and tile was $12,950. It is impossible to give the value of the other products without disclosing individual output.

LEHIGH COUNTY.

The mineral production of Lehigh County in 1912 had a value of $5,872,137. Cement was manufactured to the quantity of 6,801,881 barrels, with a value of $4,282,085, over 70 per cent. of the entire output of the county.

The following table gives the quantity and value of the several products reported in the county.

MINERAL PRODUCTION OF LEHIGH COUNTY, 1912.

Product.	Quantity.	Value.
Brick and tile,	.....	$219,645
Sand and gravel, short tons,	557,583	367,872
Cement, barrels,	6,801,881	4,282,085
Slate,	.....	773,988
Lime, short tons,	6,901	23,431
Miscellaneous,*	.....	205,116
Total,	.....	$5,872,137

*Includes mineral paints, clay, iron ore, sandstone, limestone and mineral waters.

LUZERNE COUNTY.

Luzerne County in 1912 had a mineral production of a total value of $69,749,155, of which anthracite coal represented over 95 per cent.

The following table gives the value of the several products reported from this county.

MINERAL PRODUCTION OF LUZERNE COUNTY, 1912.

Product.	Quantity.	Value.
Brick and tile,	.....	$155,241
Anthracite coal, gross tons,	28,295,159	69,425,134
Sandstone,	.....	122,981
Miscellaneous,*	.....	45,799
Total,	.....	$69,749,155

*Includes mineral paints, sand and gravel, trap rock, and mineral waters.

LYCOMING COUNTY.

The total mineral production of Lycoming County in 1912 was $172,575. One-third of this was represented by the lime produced, of which 27,453 tons were burned, with a value at the kilns of $58,938. The value of bluestone quarried was $13,927. Of sand and gravel 107,457 short tons were produced, with a value of $39,727. The other products include mineral paints, brick and tile, bituminous coal, sandstone and limestone, with a combined value of $59,983.

McKEAN COUNTY.

The total mineral production of McKean County in 1912 had a value of $3,977,890. Much the larger portion of this was represented by petroleum, of which 1,501,773 barrels were produced, with a value of $2,405,270. Brick and tile were produced with a value of $556,304. The other products include clay, bituminous coal, sandstone, bluestone, and natural gas.

MERCER COUNTY.

The mineral output of Mercer County in 1912 had a total value of $1,427,415, of which over two-thirds was represented by the bituminous coal produced.

The following table gives the quantity and value of the several products produced in this county.

MINERAL PRODUCTION OF MERCER COUNTY, 1912.

Product.	Quantity.	Value.
Bituminous coal, short tons,	846,228	$1,052,367
Sand gravel, short tons,	81,690	54,638
Sandstone,	.....	30,650
Petroleum, barrels (42 gallons),	42,866	57,284
Miscellaneous,*	.....	222,476
Total,	.....	$1,427,415

*Includes brick and tile, clay, pyrite, limestone, mineral waters, and natural gas.

MIFFLIN COUNTY.

The mineral production of Mifflin County in 1912 had a total value of $202,322. Over 60 per cent. of this total was represented by sand and gravel, of which 120,121 tons were produced with a total value of $126,061. Limestone was quarried to the value of $54,225. The other products were brick and tile, pottery, and lime, with a combined value of $22,036.

MONROE COUNTY.

Monroe County had a mineral production in 1912 of a total value of $56,295, of which almost one-half wre represented by brick and tile, which was produced to a value of $27,723. The other products reported were sandstone, lime, and mineral waters, with a combined value of $28,572.

MONTGOMERY COUNTY.

Montgomery County in 1912 had a mineral production with a total value of $888,789. The largest individual product was that of lime, of which 76,796 short tons were burned, with a total value at the kilns of $304,753. This was followed by brick and tile with a value of $196,646, and limestone with a value at the quarry of $180,193.

The following table gives the value of the several products reported from this county.

MINERAL PRODUCTION OF MONTGOMERY COUNTY, 1912.

Product.	Value.
Brick and tile,	$196,646
Granite,	47,952
Trap rock,	34,864
Limestone,	180,193
Lime,	304,753
Miscellaneous,*	124,381
Total,	$888,789

*Includes clay, sand and gravel, pottery, talc and soapstone, sandstone, and marble.

MONTOUR COUNTY.

The total mineral production of Montour County in 1912 had a value of $17,679. Of this amount over two-thirds is represented by the value of the lime produced, which amounted to $12,165 at the kilns. The other products were brick and tile, sand and gravel, and bluestone, with a combined value of $5,514.

NORTHAMPTON COUNTY.

Northampton County in 1912 had a total mineral production to the value of $13,282,738. The cement was the largest individual item, of which 14,667,370 barrels were sold, with a value of $10,081,026. The next largest item was slate, which was quarried to the value of $2,600,449.

The following table gives the quantity and value of the several products reported from this county.

MINERAL PRODUCTION OF NORTHAMPTON COUNTY, 1912.

Product.	Quantity.	Value.
Mineral paints,	.....	$120,310
Brick and tile,	.....	93,154
Sand and gravel, short tons,	83,769	28,342
Cement, barrels,	14,667,370	10,081,026
Slate,	.....	2,600,449
Limestone,	.....	211,565
Lime, short tons,	16,237	60,492
Miscellaneous,*	.....	87,400
Total,	.....	$13,282,738

*Includes talc and soapstone and marble.

NORTHUMBERLAND COUNTY.

In 1912 Northumberland County had a mineral production, according to the reports received by the Topographic and Geologic Survey, of $14,641,111. Of this total anthracite coal represented almost the entire amount, 6,030,088 gross tons having been mined, of a total value of $14,441,226. Brick and tile were produced with a value of $101,496, and 10,661 short tons of lime were burned, of a value at the kilns of $21,339. The other products reported were sand and gravel, trap rock, and limestones, with a combined value of $77,050.

PERRY COUNTY.

The mineral production of Perry County in 1912 had a value of $11,776. Of this total over one-half was represented by the lime manufactured, of a total value of $6,240. Sand and gravel and limestone combined had a value of $5,536.

PHILADELPHIA COUNTY.

The total mineral production of Philadelphia County in 1912 had a value of $2,591,379. Of this total much the larger part was represented by the brick and tile manufactured, which had a value of $2,016,584. The other products reported include sand and gravel, pottery, and granite, with a combined total value of $574,795.

PIKE COUNTY.

The only mineral production reported in 1912 from Pike County was bluestone, which was quarried to a value of $94,709.

POTTER COUNTY.

Potter County in 1912 had a mineral production with a value of $67,532. Of this output 15,076 barrels of oil were produced to a value of $24,136. The other products were bluestone, mineral waters and natural gas, to a combined value of $43,396.

SCHUYLKILL COUNTY.

The total reported value of the mineral production of Schuylkill County in 1912 was $37,417,018, almost entirely represented by anthracite coal. There was mined of anthracite coal 16,055,848 gross tons, with a value at the mines of $37,332,871. The other products reported were brick and tile, sand and lime, with a combined total value of $84,147.

SNYDER COUNTY.

The mineral production of Snyder County in 1912 includes iron ore, limestone and lime, with a combined value of $3,345.

SOMERSET COUNTY.

In 1912 Somerset County had a mineral production of a total value of $11,233,138. This was mainly represented by bituminous coal, of which 9,888,144 short tons were mined, with a value at the mines of $11,034,445. Lime was burned to the value of $12,030. (4,700 short tons) and limestone was quarried to the value of $3,924. The value of brick and tile made was $124,735. The other products reported were clay, sand and gravel, sandstone and mineral waters, which had a combined value of $58,004.

SULLIVAN COUNTY.

The entire mineral production of Sullivan County in 1912 included anthracite coal, sand and gravel, with a total value of $1,115,135.

SUSQUEHANNA COUNTY.

The mineral production of Susquehanna County in 1912 consists of brick and tile, anthracite coal and bluestone, with a combined value of $1,308,804.

TIOGA COUNTY.

The total mineral production of Tioga County in 1912 had a value of $1,571,725. Over 95 per cent. of this was represented by bituminous coal, of which ..... short tons were mined, with a value at the mines of over $1,500,000. The other products were clay and petroleum.

UNION COUNTY.

The mineral output of Union County in 1912 consists of mineral paint, limestone and lime, with a combined total value of $31,298. Over 98 per cent. of this value was represented by the lime produced.

VENANGO COUNTY.

In 1912 Venango County had a mineral production with a total value of $3,093,559. Of this amount $2,171,446 was represented by petroleum, of which 1,300,534 barrels were produced. Of sand and gravel 124,015 tons were produced with a value of $100,634. The other products reported were sandstone, mineral waters and natural gas.

WARREN COUNTY.

The value of the mineral production of Warren County in 1912 was $2,135,080. Of the total production 421,024 barrels of petroleum were produced to a value of $686,957. The other products were brick and tile, natural gas, sand and gravel, and mineral waters.

WASHINGTON COUNTY.

The mineral production of Washington County in 1912 had a total value of $20,420,361. Of this total $18,012,167 was represented by bituminous coal, of which 16,645,127 short tons were mined.

The following table gives the value of the several products reported from this county.

MINERAL PRODUCTION OF WASHINGTON COUNTY, 1912.

Product.	Value.
Brick and tile,	$288,216
Bituminous coal,	18,012,167
Petroleum,	826,502
Miscellaneous,*	1,293,478
Total,	$20,420,361

*Includes pottery, sandstone, limestone, and natural gas.

WAYNE COUNTY.

The only mineral products reported from Wayne County in 1912 were sand and gravel, and bluestone, which were produced to a combined value of $18,421.

WESTMORELAND COUNTY.

In 1912 Westmoreland County had a total mineral production of a value of $32,488,581.

The following table gives the quantity and value of the several products in Westmoreland County.

MINERAL PRODUCTION OF WESTMORELAND COUNTY, 1912.

Product.	Quantity.	Value.
Brick and tile,	.....	$528,942
Bituminous coal, short tons,	30,589,549	30,971,778
Sand and gravel, short tons,	166,657	198,670
Sandstone,	.....	10,080
Limestone,	.....	241,669
Lime, short tons,	4,971	10,361
Miscellaneous,*	.....	524,081
Total,	.....	$32,488,581

*Includes clay, pottery, bluestone, mineral waters, and natural gas.

WYOMING COUNTY.

In 1912 the only mineral products reported from Wyoming County were bluestone and mineral waters, which combined had a total value of $51,947.

YORK COUNTY.

The total mineral production of York County in 1912 had a value of $803,176..

The following table gives the value of the several products reported.

MINERAL PRODUCTION OF YORK COUNTY, 1912.

Product.	Value.
Brick and tile,	$122,065
Limestone,	132,668
Lime,	232,026
Quarry products,*	98,328
Miscellaneous,†	218,089
Total,	$803,176

*Includes trap rock, bluestone and slate.
†Includes sand and gravel, pottery, and cement.

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